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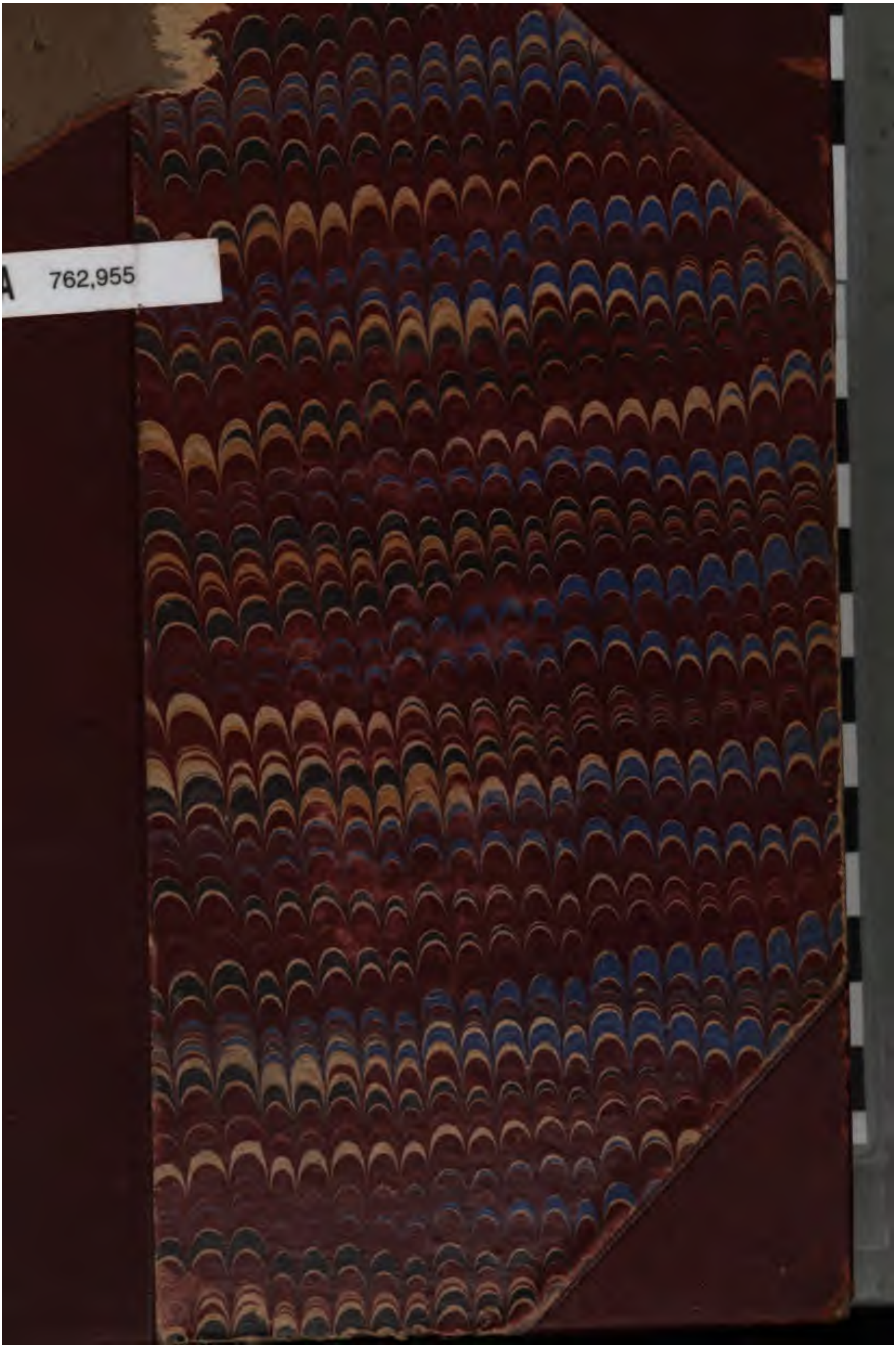

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PROCEEDINGS

OF THE

ANNUAL MEETING

OF THE

ROADMASTERS' ASSOCIATION

OF

AMERICA,

HELD AT

Saint Paul, Minnesota,

September [illegible]

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HELD AT

ST. PAUL, MINNESOTA,

SEPTEMBER 15-17, 1883.

PUBLISHED BY
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PROCEEDINGS OF THE ANNUAL MEETING
OF THE
ROADMASTERS' ASSOCIATION OF AMERICA,
HELD AT
ST. PAUL, MINN., SEPTEMBER 15, 16 AND 17, 1883.

ST. PAUL, Sept. 15, 1883.

The meeting was called to order by President Burnett at 2:30 P.M., in the following remarks:

GENTLEMEN,—The hour having arrived to which this meeting was adjourned at Chicago on June 14, you will please come to order.

On June 13 and 14 a number of roadmasters met in Chicago for the purpose of organizing a roadmasters' association, which they did, under the name of The Roadmasters' Association of America. The Secretary will please read the minutes of that meeting, so far as they were taken. They were not taken very fully.

The Secretary read the minutes, as follows:

PRELIMINARY PROCEEDINGS.

Pursuant to a call from Mr. I. Burnett, of the Chicago, Rock Island & Pacific Railroad, a meeting of roadmasters was held at the Matteson House, Chicago, June 13, 1883.

The meeting was called to order at 9:30 A.M. Mr. I. Burnett was chosen Chairman, and Mr. Tierney, Secretary.

Mr. Burnett, on taking the chair, announced the object of the meeting, and a general interchange of opinion was had. The discussion resulted in a determination to effect a permanent organization, which it was decided to call THE ROADMASTERS' ASSOCIATION OF AMERICA.

A motion was adopted that until a Constitution and By-Laws could be prepared, the officers of the Association should consist of President, First and Second Vice-Presidents, Secretary, Treasurer, and an Executive Committee of five members, including the President and Secretary.

The following officers were elected:

President—I. BURNETT, Chicago, Rock Island & Pacific Railroad.
First Vice-President—G. C. MCMICHAEL, Louisville & Nashville Railroad.
Second Vice-President—DANIEL WRIGHT, Chicago, Milwaukee & St. Paul Railroad.
Secretary—J. TIERNEY, Chicago, Rock Island & Pacific Railroad.
Treasurer—THOS. ADAMSON, Ohio & Mississippi Railroad.
Executive Committee—S. L. SWINNEY, Wabash, St. Louis & Pacific Railroad; J. H. MCDONALD, Chicago & North-Western Railroad; J. C. EVANS, Wisconsin Central Railroad.

The President delivered a short and interesting address, after which the Secretary read a Constitution and By-Laws which had been prepared.

Mr. McMichael, Mr. McClintock and Mr. McQuiston were appointed a committee to examine, revise and report upon the code at the next regular meeting.

The afternoon was devoted to a visit to the Railway Exposition, and an invitation, from the management of the Chicago, Rock Island & Pacific Railroad, to use a special train to visit Pullman and the North Chicago rolling mills, was accepted.

CHICAGO, June 14, 1883.

The morning was devoted to the enjoyment of the train furnished by the Chicago, Rock Island & Pacific Railroad, as of record the 13th.

The business meeting was called to order at 2 P.M., and it was decided to hold the regular meeting at St. Paul, Minn., commencing the second Wednesday in September, 1883.

After an informal discussion, the President and Secretary were directed to prepare a blank form of certificate of membership, and to procure a suitable seal for the official use of the organization.

A committee of three having been appointed to prepare a list of subjects to be discussed at the next regular meeting, reported as follows:

1. Drainage—Tools and Appliances.
2. Crossties—Manner of Laying; What, if Anything, will Take the Place of Wood?
3. Joints—Best Fastenings, and Manner of Putting Together; What Nut Lock?
4. Surfacing—Manner of Filling in Track with the Different Kinds of Material; Elevation of Curves.

5. Frogs and Switches.

6. Creeping of Rails—The Cause and Prevention.

7. All Life-Saving Appliances, especially Footguards for Frogs and Switches. Bring sample.

On motion of Mr. Wright, of the Chicago, Milwaukee & St. Paul Railway, a vote of thanks was given the proprietors of the Matteson House for favors shown the Association, and to Mr. T. J. Brush for complimentary tickets to the Exposition.

On motion of Mr. Cox, of the Chicago, Milwaukee, St. Paul & Omaha Railway, a vote of thanks was given the management of the Chicago, Rock Island & Pacific Railroad, for courtesies shown the Association.

The convention adjourned at 4:30 P.M., to meet in St. Paul on the second Wednesday of September, 1883.

THE PRESIDENT: Gentlemen, you have heard the minutes of the meeting in Chicago; what will you do with them? If there is no objection, they will stand accepted. The minutes are approved.

The first business in order would be the enrollment of new members, but as the By-Laws were given into the hands of the Committee for revision, it will be necessary to call upon that Committee for a report, in order that we may be able to get them back into the hands of the Association, so that they may be read in order that members may know what they are doing.

MR. MCQUISTON: Mr. President, as Chairman of that Committee, I have the honor to tender to the Association our report.

The report was read by the Secretary, as follows:

Your Committee to whom was referred the revision of the Constitution and By-Laws, respectfully report, that after a consideration of the same, they recommend their adoption as they now stand.

J. C. MCQUISTON,
GEORGE C. MCMICHAELS,
W. H. MCCLINTOCK.

THE PRESIDENT: Gentlemen, you have heard the report of the Committee, what will you do with it?

MR. MOLL suggested that there were quite a number of members now present who had not heard the By-Laws read, and it would be proper that they be read at this time.

After the reading of the By-laws by the Secretary, Mr. Wright moved that they be adopted and the Committee discharged. *Carried.*

Mr. Swinney: I would suggest that the roll be called, that we may see what members are present.

Upon the roll being called by the Secretary, the following members answered to their names:

I. Burnett,	Chicago, Rock Island & Pacific Railroad.
Thomas Rafferty,	Chicago, Milwaukee & St. Paul Railroad.
Thomas Adamson,	Pittsburgh Division, Baltimore & Ohio Railroad.
W. H. McClintock,	Louisville and Nashville Railroad.
J. H. Preston,	Chicago, Rock Island & Pacific Railroad.
T. W. Raynor,	Chicago & Grand Trunk Railroad.
S. L. Swinney,	Wabash, St. Louis & Pacific Railroad.
J. A. Crippen,	Des Moines & Ft. Dodge Railroad.
J. B. Moll,	Chicago, Milwaukee & St. Paul Railroad.
David Wright,	Chicago, Milwaukee & St. Paul Railroad.
A. Cox,	Chicago, Minneapolis, St. Paul & Omaha Railr'd.
George B. Tripp,	Chicago, Milwaukee & St. Paul Railroad.
Thomas Adamson,	Ohio & Mississippi Railroad.
J. C. McQuiston,	Cincinnati, Indianapolis, St. Louis & Chicago.
John Tierney,	Chicago, Rock Island & Pacific Railroad.
O. D. Richards,	Lake Shore & Michigan Southern Railroad.

The President: The enrollment of new members will be in order.

The following new members paid their dues and were admitted as members of the Association:

P. J. Kelley,	Cincinnati, Indianapolis, St. Louis & Chicago.
A. Moore,	Cincinnati, Indianapolis, St. Louis & Chicago.
E. H. Mott,	Great Bend, Winona & St. Paul Railroad.
James Sloan,	Chicago & Eastern Illinois Railroad.
J. H. Bowen,	Chicago, Milwaukee & St. Paul Railroad.
C. H. Stockwell,	Chicago, Milwaukee & St. Paul Railroad.
P. H. Hennessey,	Chicago, Milwaukee & St. Paul Railroad.
J. E. Cox,	Chicago, Milwaukee & St. Paul Railroad.
G. W. Dunning,	Chicago, Rock Island & Pacific Railroad.
J. C. Brennan,	St. Paul, Minneapolis & Manitoba Railroad.
M. A. Stafford,	Central Iowa Railroad.
C. D. Shattuck,	Chicago, Milwaukee & St. Paul Railroad.

The President: A gentleman with whom I am acquainted, Mr. George M. Williams, of the Chicago, Rock Island & Pacific Railroad, could not be here, and is desirous of becoming a member of the Association; can he do so by recommendation?

Mr. McQuiston: I think that any roadmaster in good standing, who sends in his application, and who is known to any of the members, should be admitted, and I will make a motion that any roadmaster in good standing, who sends his application to any regular meeting of this Association, may become a member of it by a vote of the members present, provided that he is recommended by a member present.

The motion prevailed, and Mr. Williams was declared a member.

The President, Mr. I. Burnett, then delivered the following address:

Gentlemen of the Convention,—It being one of the first duties of railroad men to be on time, I will be allowed to congratulate you upon your promptness to-day. Our second meeting I have regarded as more of an experiment than the first. To the first some may have come prompted by curiosity; those who come to the second are the kind that will stick together. They are the ones who mean business, and that is the only kind of mean business such men ever get into. It is well, too, that we do meet together. Solomon — I think it was Solomon — said, "It is not good for man to be alone." He practiced as he preached, for he was married, if history be true, to three hundred women. Now, with all due respect to Solomon, I am glad the said gentleman does not belong to this Association. If he did, and brought his family, we would have to charter a couple of excursion trains and several private detectives to watch the gray-headed members. No, it's not good for man to be alone. The recognition of this fact has permeated and influenced all grades of society and classes of men. Lawyers, farmers, merchants, doctors, editors have long since realized that they owed it to themselves, as men desirous of improving and advancing in their respective callings, to band together in societies. By so doing, the best thoughts, the richest experience and the most worthy theories of each individual become the common property of all. New light is cast upon a dark problem that has haunted the mind of an individual for years. It is solved at once. He in turn may be able to solve some enigma that has worried his benefactor. So, by mutual interchange of thought, great and widespread good is obtained. Last, though not least, in glancing at the advantages of such societies, we must not forget the social and friendly ties that are thereby engendered and strengthened year by year. Not only is this pleasant and profitable to us, but it likewise does its share in binding together in one vast family the great brotherhood of humanity. Especially is this true of ourselves. Men in other pursuits and professions meet often to exchange views and for social intercourse, aside from the opportunities afforded by these societies. From the very nature of our vocation, we are debarred from this pleasure. Separated by wide expanses of territory, isolated, as far as personal communication goes, almost as completely as Robinson Crusoe on his sea-washed isle, it is only in an organization such as this that we can hope to meet and confer with each other, to our mutual benefit. And I affirm that there is no class of men on the broad earth to-day upon whose shoulders rests a greater degree of responsibility than that which rests upon ours. We owe it to our companies, to the traveling public and to ourselves to become as proficient as possible in our calling.

The God of creation has made no beast swift and strong enough to satisfy the demands of impatient and restless man. So man has supplied the deficiency by the exercise of his marvelous genius. He has harnessed the hurricane in a harness of iron and steel, and feeds him with flames. We get on board the magnificent train drawn by this steed. What a little world is there! Strange people from every clime gathered from here and there! Many are going to build homes in the vast, illimitable, changing West. They are the waves of what will soon be a human sea that roll over the blossoming prairies and deluge them with wealth and joy. In those palaces we see many a picture, each worthy to be framed in our memory. Here is a young mother with her babe on her knee and the love light flowing from her eyes like a blessing. There is an aged couple, with heads frosted by many winters. They have left most of earth's cares behind them. They have left the little village in the East, where they have passed many happy days together, and are now journeying west to see their boy who came out long ago. He has prospered and grown rich. Just behind them is a young couple upon their wedding tour. To them the world is as rosy as if no hope ever died in it, or grief had never once raised her ghastly head. They see no ashes of flowers that withered and fell. These are pictures of human life. What trustful pictures they are! No fear or shadow of fear comes into the eyes of the young or old as they are whirled over dizzy bridges, past huge rocks and hills, through frowning forests and dark tunnels, not a fear nor a doubt.

The master's eye has been upon upon the path and paved it smoothly for the flying train laden with human freight. To the master's vigilance through summer's heat and winter's howling blast is due the safety of the human occupants of those flying palaces. I wish to say a word here for the men who deal the hard blows, face the bitter storms, swelter in the relentless heat, and brave the life-chilling cold for a pittance per day. They live hard, work hard, and many of them die hard. The flowers that spring up in their paths are few. They are called upon to throw themselves against the elemental forces of nature, to overcome by the efforts of human flesh and blood the obdurate rock, the stubborn iron, the heavy clay and the unyielding resistance of the plain, the forest and the mountain. In their cheerless labor we behold the conquering of the insensate masses, the ponderous bulks, the previously undisturbed aggregations of myriads of centuries. All this is done by the laboring classes of the country. Yours it is to direct, theirs to do, yours to fashion, theirs to form, yours to conceive, theirs to execute; you have pleasant homes and interesting families, the doors of society are open to you, while want dwells in their home, and society is a sealed book to them. Their sorrows are many; their joys are few; it is lamentably true that the majority of these men have large families, and small pay. In view of all this, I adjure you to exercise at all times kindness to these men with whose destinies and happiness you have so much to do. Deal kindly, fairly and honestly with our employes, for by so doing we receive honest labor in return.

Gentlemen, it's for our mutual improvement that we have met in this beautiful city to-day. I feel the importance of this Association to the country, whereby we may openly discuss questions and arrive at conclusions as to the best materials and devices to be used in railroad construction and repairs; lives and property are at stake, and the Supreme Court of the United States may have to decide questions where our testimony will be of service, questions to be decided by practical men, and I look upon this Association as of as much importance as any Association in this country, and I hope none will fail to feel that importance, and that every one has come here with an earnest spirit to investigate, and discuss, so that we may arrive at the very best conclusions, and present them to the country as a guide for every road.

In conclusion I believe that roadmasters are confined more closely to their work than any other class of men in the world. We are tied down in our daily employment, we seem to feel that we can hardly leave our work for an hour, yet it is necessary for us, and for our interests and the interests of our roads, that we come and have this interchange of opinion; and the extent of the work we have to perform, and the responsibilities we have, really require a little recreation once a year. Now as to recreation, we should not come and make this a mere pleasure trip; we should keep before us the main point of the work; let that be the object, and our pleasures a secondary consideration. I thank you one and all for your kind attention.

After the reading of the address, **Mr. McQuiston** said: I move that the address be printed, and a copy sent to each member, and that a portrait of our worthy President be also published with it. It seems to me to be the best written document I have listened to for a long time. It hits the situation exactly. I think that every man should be in some degree a representative of the average sentiments and average intelligence of the men whom he controls. He cannot control them simply by mechanical or tyrannical means or power; he must in some degree be a representative of their average sentiments and wants. If he is such a man, he can make these poor people with whom he has to deal in some degree happy; he can conduce to their welfare, and it is well known that under those circumstances his men will do much more to further the interests which he has under his charge than he can possibly get them to do by mere brute force. I think, Mr. President, you have embraced all the points, and I insist that a portrait of the orator be procured and attached to the address. I make that as a *motion.*

Mr. Swinney: I second that motion.

The President: Before I put Mr. McQuiston's motion, I would say that I believe that the proceedings of this meeting should be published entire in book form, and I hope the members will talk that matter up, and that before the meeting closes a motion will be made and adopted to that effect. We have a stenographer here who is keeping a complete record, and I think it should be published, and a copy of the book furnished to each member. I see no reason for printing the address except in this book, if anywhere. No portrait, thank you.

Mr. McQuiston: All that I agree to, but I insist on the portrait. We must have that.

Mr. Adamson: I move as an amendment that a copy be sent to the superintendents of the roads which they represent, as well as to each member.

Mr. Preston: Does that include the proceedings of this meeting, also?

Mr. Adamson: No; that is separate.

The motion prevailed, only one dissenting vote—the President.

The President: I would like to hear the views of some of the members present in regard to the Association, and I do not know of any one who could express them better than Mr. McQuiston.

Mr. McQuiston: I think we had better hear from Mr. Preston.

Mr. Preston: I will say, gentlemen, that I have intended to make some remarks, but I prefer to wait until we are organized. After the election of officers, and the time comes for short speeches, I will try and give my views to the Association.

Mr. McQuiston: It seems to me this is a very good time. The organization is complete.

Mr. Preston: I think we shall have more members here tomorrow, or perhaps next day, and I would prefer to wait.

The President: Gentlemen, the next business in order is the reading of communications. I have several here.

The Secretary read the following letters:

From W. H. Courtney, *Roadmaster Lake Shore & Michigan Southern Railway.*

Yours of 27th ult. received. Up to the first of this month I had expected to attend the meeting at St. Paul, but now find it impossible to be absent at that time.

From **GEO. C. MCMICHAEL**, *Roadmaster Louisville & Nashville Railroad.*

Events of the last ten days have been of such a character as will prevent my attendance at the St. Paul meeting on the 12th–14th insts. I have accepted the position of superintendent of the Nebraska, Iowa & Wisconsin Railway Co., with headquarters at Marshalltown, Iowa, and must report for duty on Tuesday, 11th. I regret to inform you of the severe sickness of our Mr. W. H. McClintock, superintendent of the Louisville Division, and of his inability to attend on that account. I to-day send to Mr. McQuiston the copy of the Constitution and By-Laws for him to take to the meeting, or, in the event of his not going, to mail you at St. Paul. I hope to see you some time in Chicago. My best wishes for the success of the Association, as well as yours personally.

From **R. H. CHAMBERLIN**, *Div. Supt. Chicago, Rock Island & Pacific Railway.*

Yours of this date at hand, and in reply would say, that I will have a train ready at 8 o'clock to-morrow, A.M. Would be pleased to accompany the delegates of Roadmasters' Association to South Chicago and Pullman. Mr. A. Kimball, Genl. Supt., will leave on train 11 for Davenport, and the Raymond special train, that I will have to see to the transferring of at Grand Trunk Crossing, Blue Island, I am sorry to say, will prevent me from doing so. My regards to the delegates, hoping they will have a pleasant trip.

From **H. G. FLEMING**, *Supt. and Chief Engineer Memphis & Little Rock Railroad.*

I have your circular of August 20th. Will you kindly advise me where to obtain a copy of the proceedings of your convention, to take place at St. Paul, September 12th, 13th and 14th? I shall be greatly interested.

From **E. A. BOARDMAN**, *Roadmaster Union Pacific Railroad.*

Your circular, dated August 20, 1883, at hand. Glad to hear there has been interest taken to establish something for the interest of those employed as roadmasters, and for the welfare of companies, etc., employing them, and don't see why an association of the kind would not prosper, as well as other like organizations of different kinds throughout the country, and as for my part, I have heard only now and then of an association being formed, but never seen or heard anything further. Would like very much to hear from the officers of it, and to understand more fully their object, and would take an interest in it to promote its growth. As to the meeting taking place at St. Paul, I am sorry to say my wife and I have arrangements all ready for a trip west, but anything I can do for the interest of the Association I will gladly attend to. Hoping to hear from you again, Mr. President, further, as to the Association, such as By-Laws, etc., I remain very respectfully, yours truly.

From E. B. **Wakeman**, *Ass't General Superintendent St. Paul, Minneapolis & Manitoba Railway.*

Replying to yours of the 13th inst., we will be pleased to furnish special from St. Paul to the lake and return, complimentary, and will arrange to have as many of our men attend as possible.

To the Officers and Members of the Roadmasters' Association of America:

Gentlemen,—The Chicago, Milwaukee & St. Paul Ry. have kindly tendered to me a special train for your use from St. Paul to Minneapolis and west, on their Hastings & Dakota Division, to see the exhibit and practical working of the Case, Long & Pattee Ditching Machine.

Yours truly, J. B. **Moll**.

The President: I will say to the Association that I wrote Mr. Fleming that if the proceedings of the meeting were published, and that they undoubtedly would be, I should take great pleasure in sending him a copy.

Gentlemen, you have heard the invitation of the St. Paul, Minneapolis & Manitoba people, tendering us a train to Lake Minnetonka, also the invitation of the Chicago, Milwaukee & St. Paul road. What will you do in regard to them?

Mr. Moll: I make a motion, gentlemen, that we accept the invitation of both companies, taking the Chicago, Milwaukee & St. Paul train at say eight o'clock to-morrow morning, and the Manitoba road on Friday morning, at the same time, for Lake Minnetonka, leaving St. Paul from the main depot.

Mr. Sloan: Mr. President, as Mr. Moll has been Chairman of our Committee of Arrangements, I move that we let him arrange our excursions for us.

The motion was amended by inserting the name of Mr. Brennan with that of Mr Moll, constituting them a Committee on Excursions, and in that form carried.

The President: Gentlemen, the next business in order will be the reports of committees, and as I was a committee of one to procure a seal and a certificate of membership for the Association, I have done as well as I could, and as I was not limited, I procured some stationery also.

Mr. McQuiston: I move that this be adopted as the seal and certificate of membership of this Association, and that the Committee be discharged. Motion carried.

Mr. Cox. I move that these By-Laws be published in book form, and that each member be furnished with a copy. Carried.

MR. SWINNEY: Mr. President, I will ask if there has been any arrangement made toward securing a room for our meetings.

THE PRESIDENT: None that I know of, with the exception of this one, which Mr. Bronson has kindly tendered us.

MR. SWINNEY: Then I move that a committee of three be appointed by the Chair to secure a room, and that it report to this meeting before an adjournment. Carried.

Messrs. J. B. Moll, D. Wright and I. Brennan were appointed as the Committee.

DRAINAGE.

THE PRESIDENT: Discussion of questions adopted for consideration at our meeting in Chicago is next in order, and the first one is "Drainage, Tools and Appliances." This question will have to stand by itself, and I think it would be well for us to appoint a committee of three to act as a jury, as it were, who shall sit and hear the views expressed, and then make a report, and then that report can be either accepted or rejected by the Association.

MR. SLOAN: I move that a committee of three be appointed by the Chair to report at our meeting to-morrow, the best form of ditch, distance from the rail and degree of slope for mud, gravel and stone. Carried.

THE PRESIDENT: I will appoint as such committee Mr. Swinney, Mr. P. J. Kelley and Mr. James Sloan. We would like to hear from Mr. McQuiston.

MR. MCQUISTON: On the subject of ditching, I will relate an anecdote told of one of the old engineers of the Pennsylvania Road, which is supposed to be one of the best railroads in America to-day, and perhaps in the world. A young man came to him to learn the business of engineering. He told him to go over the line and see that the road was ditched, and in about six months the young man came back and said that the road was properly ditched. He said to the young engineer, "Go back and ditch the road again."

The ditching of a road properly is something that is never finished. In our ditching we fill out two feet beyond the end of the ties, straight, dress top, and then run to the ditch, seven feet from the rail. That is our method. We would be very glad to learn of anything that *is better.* Our trains are running fifty miles an hour, and we have forty-one ton engines hauling our passenger trains, and we have curves and grades and all that sort of thing, and have come up here to learn from some of these gentlemen a better method if we can. It puzzles us wonderfully to know just exactly what is the best method.

Mr. Preston: Do we understand that you run the ditch out to a slope on the back side?

Mr. McQuiston: Yes, we go two feet from the rail and then we run out. Seven feet is the edge of our ditch.

The President: What is the depth of it?

Mr. McQuiston: As deep as we can get it. If our cuts are narrow and will not admit of a deep ditch, we do with what we can get.

The President: Where you can, you get it seven feet from the rail.

Mr. McQuiston: Seven feet if we can, one and a half to one, and a foot deep, and slopes on both sides. We make both slopes alike.

The President: Do you have any trouble with your banks sliding — sloughing off?

Mr. McQuiston: Whenever they slide, we dig it out and haul it away.

The President: What I wanted to ask you was, if it runs off your bank, as it will in wet weather, and you can't touch it, do you find that it fills up and turns the water up to your track more than a box ditch?

Mr. McQuiston: We dig it right out and haul it away — truck it if it is possible. We never tried a box ditch.

Mr. Sloan: The natural rattling and falling of the bank through the summer, providing it does not make a general slide, does not that naturally crowd the water toward your track, and does not your space lessen all the time?

Mr. McQuiston: Yes; but we take it from the cuts and use it in the fills, where we need it.

The President: You make your ditch one and a half feet to one in slope. Where do you commence with your ditch? How far from the end of the tie? In other words, how much berme do you leave outside of the end of the tie?

Mr. McQuiston: We leave three feet from the rail before we start the ditch. We fill out two feet from the rail, and from there we have a flat place of a foot, and then we start this one and a half to one. That is what we consider our best style of dressing up.

Mr. Sloan: Where it is dirt ballast?

Mr. McQuiston: No; we have stone and gravel.

Mr. Hayward: Mr. President, on the subject of ditching I would state, that I have never known a road that was ditched sufficiently. There is not enough ditching done. If you have drainage you have a good road, I don't care whether it is stone, gravel, or mud. We have some of all kinds.

Mr. Preston: It appears, Mr. President, that the first question here is, "Drainage." I suppose that means ditching. Now, my practice has been this: To leave four feet — that is, where we have what we call mud track to deal with — we would commence four feet from the rail and slope; go down gradually so as to have at nine feet from the rail a two-foot ditch; cut the opposite side of the bank very nearly straight down, unless it is a sliding bank; if so, give it a little more slope. In that way I have very good success.

Mr. Kelly: Do we understand that when you get your nine feet, you have a ditch two feet below the berme?

Mr. Preston: Two feet below the top of the tie, which we always take as a grade line. I am talking now about a mud country like Indiana and Iowa. You might do differently in Illinois.

Mr. Swinney: I understand that in a mud track you dig your ditch two feet below the top of the tie at nine feet from the rail.

Mr. Preston: Nine feet from the rail.

The President: What sort of a ditch do you approve of when you have a ballasted track?

Mr. Preston: We commence four feet outside of the rail. That fixes a solid berme for your ballast to lay over, and you can cover your ties up.

Mr. Sloan: Then you commence four feet outside of your rail for your ditch.

Mr. Preston: Yes.

The President: And what is your slope from there?

Mr. Preston: The slope is about one inch to one foot for the first two feet, and then I commence to go down so as to get two feet at nine feet from the rail.

The President: What tools or appliances have you used with success in ditching?

Mr. Preston: We use various tools. I have used a large plow rigged on a flat car; I took a timber and placed it crosswise of the car, and let the end project, fastening it firmly.

Mr. McQuiston: What did you do when you had no construction train?

Mr. Preston: Cast it out on the bank.

Mr. McQuiston: That is the way we do.

Mr. Kelley: Have you found that you could make your ditch cheaper by the use of the plow, than you could without it?

Mr. Preston: Yes, on a wet cut. I run the plow through and drain the water off; then the men can work it, and can handle it very nicely.

Mr. Moll: Then when it is so hard that men can't shovel it, it is cheaper to work a plow than picks.

Mr. Preston: Yes, that has been my experience.

Mr. Swinney: Mr. President and gentlemen, I haven't anything on my division but mud track; there is no ballast of any kind. In forming my ditch, I commence at the ends of the ties, and slope from there to the ditch. I make a box ditch at least two feet wide on the top and eighteen inches at the bottom, and make it seven feet from the rail. I find that that gives me good drainage. I do not use a square ditch, but it is nearly so. If the water runs within two feet of your rail, it will not injure your track, so long as it keeps running.

The President: Did you ever make a trial of sloping direct from the bottom of your tie to the bank, letting the two slopes meet and form your ditch?

Mr. Swinney: Yes, but it will fill up much quicker. We make our ditches a foot deep and eighteen inches wide on the bottom, and in many places wider than that.

Mr. Cox: Have you any tile now in use?

Mr. Swinney: I have, and I find that that makes the thing perfect, that is, as near as mud track can be perfect.

The President: What do you put over your tile? Just fill it up with mud?

Mr. Swinney: Fill it right in.

Mr. Hayward: If you were going to use tile, would you still keep your box ditch over them, and sink your tile still underneath the ditch?

Mr. Swinney: We aim to have a kind of a ditch over the tile to carry off as much of the surface water as we can.

Mr. Preston: In the winter do you find any trouble with your tile heaving up?

Mr. Swinney: No, we put it below frost.

Mr. Brennan: Have you used any tools in your ditching?

Mr. Swinney: I have used a plow; I never use it, though, except when the ground is too hard to shovel, or where it is too wet to shovel. If we have to use a pick, I put a plow on.

Mr. Preston: I differ with you in regard to the ditch filling up quicker when constructed according to my method. If made in that way, you are in no danger of having your road bed cut by a heavy rain storm; whereas, by your method you are, because if your ditch is once blocked, it makes a dam, and the water flows up against your track, and cuts away the bank.

Mr. Swinney: I prefer to have the bank cut rather than the track. The water in your ditch will flow up to your ties; in mine it will not.

Mr. Preston: I guess that is so.

Mr. Cox: I have ditched a good deal in my life; I have been in Minnesota a number of years; came from between Milwaukee and Chicago here, and I have tried a great many ways, and the best method I have found for mud track is, to commence and dress your track up in the center three inches above the tie, slope from that to the bottom of the tie, and on that same slope nine feet from the rail to the outside of the ditch.

The President: Did you ever use any tools outside of plows?

Mr. Cox: I have never used anything but the old-fashioned way of ditching until this summer, when I procured one of these Milwaukee ditching machines to use in some very muddy cuts. I ditched sixteen hundred feet, both sides, that would be thirty-two hundred feet, and it only required six men, a conductor and brakeman.

The President: Did you ever ditch the same cut with men? The old-fashioned way?

Mr. Cox: I have, and this ditching machine did the work that I could not have done with fifty men on a train.

The President: Do you mean each day?

Mr. Cox: Yes, besides all the flat cars, and did it better, I think. The ditching *machine requires* a little labor with it; for instance to run your slope from the track to the ditch that you make with your ditching machine; you should have three or four men to slope it off in there, and then it will carry it out. This ditching machine makes a ditch about two feet wide on the bottom, and it leaves it smooth.

The President: What do you think the difference in expense would be, ditching that cut by hand and with the machine?

Mr. Cox: I think these machines cost about $400 each to build them.

The President: Say nothing about the cost of building them; just the actual cost of the labor in ditching.

Mr. Cox: Well, the cost of the labor would be six men at $1.50 per day, a conductor at $3.00, and a brakeman at $2.00, and an engineer and fireman; those you would require on a ditching train; with this machine you only use one car, and I claim that in bad ditching, where it is wet and sticky, that machine will do the work of fifty men. One of our men west of here has been ditching right along with fifty or sixty men,—of course sloping down this prairie and making a first-class ditch all the way through to Sioux City, and he was over there and stayed all day, and he said that this machine did more work than his fifty men would. That is my only experience; I had it about eight days.

Mr. McQuiston: And you ditched how much?

Mr. Cox: I ditched 1,600 feet in one day, both sides, and kept out of the way of trains. The shorter the cut, the quicker you can ditch; the longer the cut is, the longer it takes in proportion, as you have further to run out with it.

Mr. Sloan: You have to run out with each load?

Mr. Cox: You run out every time your shovel fills. It is necessary to have a place to dump on.

Mr. Preston: How far out from the rail can you swing it?

Mr. Cox: You can have it rigged to go any distance you are a mind to, or just as near as you choose; any reasonable distance.

Mr. Swinney: Did you ever try that on a double track?

Mr. Cox: No, sir; I had our general superintendent come up there, as I thought a great deal of it, from the fact that I have a great many wet cuts, and I satisfied him in about five minutes that we wanted it, and he bought the right to build four of them.

Mr. Preston: Is that the machine that Mr. Moll is interested in.

Mr. Cox: Yes.

The President: That is the one we are going out to see work.

Mr. Cox: Yes; in good, solid, dry ditching it will work well.

Mr. Sloan: How much do the scoops carry?

Mr. Cox: If they are properly filled, I think they carry a yard and a half.

Mr. Sloan: How do you suppose it would be about running a quarter or half a mile with a yard and a half of dirt?

Mr. Cox: You can judge all about it when you see it work; still I don't think as a rule that men have to haul dirt that far.

The President: Do the men have to go out to dump the shovels?

Mr. Cox: Yes; when your scoop is filled, the crane is swung up, and when you get to the dump it is let down.

Mr. Sloan: Will it work in dry clay?

Mr. Cox: Yes, it will dig it right up.

Mr. Preston: You have to take some men to shovel with you?

Mr. Cox: All it requires is three or four men, and they stay in the cut; six men run these cranes.

Mr. Stockwell: Does the dirt ever stick to the scoops?

Mr. Cox: Sometimes it does, if it is very sticky.

Mr. McQuiston: I would like to hear from Mr. Brennan, one of the oldest roadmasters in this whole western country. I am old in years, but not so old, perhaps, as a roadmaster, although I have acted in that capacity about thirty years.

Mr. Brennan: I have not been railroading for the last few years, and am out of practice, but I have had considerable experience in looking after track. In regard to ditching, my experience in this western country has been that when roads are built they make their cuts too narrow. I think if the cuts are wide enough so that the plan of sloping back gradually can be adopted that it not only helps in summer and gives a better drainage, but that it helps in winter as well. We are troubled a great deal, as a general thing in this country, with track heaving in the winter, and sometimes we are obliged to cut ditches near the ends of the ties; the frost not only works *down from* the top, but it works in from the sides, and where a ditch can be made wide enough, I think it helps tremendously; it don't heave as much. Mr. Cox's plan, I think, is a very good one. We have a good deal of mud track, and there are very few roads in this country that are ballasted properly. They are improving in that respect, however. For the last two years I have not been railroading and am probably a little rusty.

Mr. Cox: All of ours is not nine feet, but we keep working back as fast as we can; keep taking out. Now, almost all of our large cuts are nine feet, but at first they were not, but we work on that principle.

Mr. Swinney: That has been my case. I have had a division of the road that was built to make money; that is, the Wabash took it after it was worn out by the construction company, and the cuts were just wide enough to let a coach through, but we are working them back as rapidily as we can.

Mr. Cox: I never saw a road have too much ditching.

Mr. Rafferty: I have but little to say in regard to ditching, but I would adopt Mr. Cox's plan. I have had considerable experience with it, and find that it works very successfully, more so than any other style of ditching mud track.

Mr. Adamson: Mr. President, I am in favor of filling in three inches in the center of tie, and sloping to the bottom of the tie, the same in gravel as I would in mud, and then get from seven to nine feet away, and let the water always run *to the cut*, instead of my road bed. I have several miles of broken-rock ballast, and I recommend breaking the rock out eighteen inches over the end of the ties and filling in, but not filling in the center of the track as high as I do in mud, or gravel, but I fill at the ends of the ties. As the rock is porous water will drain through quickly, where it will not do it in gravel or mud, and then I have that surplus rock to surface with. I think the road bed looks better, by filling it over the ends of the ties with broken rock, but as these other gentlemen have said, I am in favor of getting as far away as I can, say from seven to nine feet. The old-fashioned way was a square-bottomed ditch, but I recommend sloping to the cut; wash the cut instead of the road bed, and the broader you have it, the better your road bed looks, but we are generally curtailed, have only narrow cuts in the roads, but we keep improving.

I have not had much experience in pipe draining; I have drained some cattle guards and crossings, and I find that pipe draining answers a very good purpose for cattle guards in cuts or crossings. I use from four to six-inch common drain pipe in a culvert or cattle guard where I cannot drain otherwise than carry it a distance.

MR. COX: I find that in the way I speak of, everything that washes, washes the back side.

MR. SLOAN: Almost all of my ditches are seven feet from the rail, with two inches slope to the foot, and run back the same as Mr. Cox says; I have no ditches nearer than that. I have everything ditched with drains where there are large cuts, and ditch them back that far. Where our track is filled in, we fill in with gravel from two to three inches above the tops of the ties. When we have got sand it blows out; a heavy wind blows it all out.

THE PRESIDENT: I can't agree with the majority of the gentlemen as regards drainage. I know that none of us have enough of it, and we can't get too much of it. I prefer a ditch made with a berme of two feet outside of the gravel, to slope about two inches to the foot, then a three-foot ditch in width, two feet in depth slope front side or from berme, 3° to the foot, and all the slope I can get on back side of ditch. I have always noticed where your two slopes make the ditch that in wet weather, your gravel is always wet and your slope all mud, and when men are working it is all tramped up and looks bad. You avoid this with a good berme outside; then the water passes in the ditch and your bank dries up quickly.

THE PRESIDENT: The next question in order to come before the Asssociation is: "Cross Ties, Manner of Laying; What, if Anything, will Take the Place of Wood?"

MR. KELLEY: Now, to save time, I make a motion to appoint a committee of three to report to the Association upon these two questions: "Cross Ties, Manner of Laying; What, if Anything, will Take the Place of Wood?" and "Surfacing, Manner of Filling in Track with the Different Kinds of Material; Elevation of Curves." Motion carried.

THE PRESIDENT: I will appoint as such committee, Mr. J. H. Preston, Mr. McQuiston and J. A. Crippen.

MR. MCQUISTON: I move that a committee of three be appointed to report on the three last questions: "Frogs and Switches," "Creeping of Rails, Its Cause and Prevention," and

"All Life-Saving Appliances, Especially Footguards for Frogs and Switches." Carried.

The President: I will appoint as such committee, Mr. Cox, Mr. Geo. W. Downing and Mr. Adamson.

The Committee to whom was referred the matter of obtaining a place for the holding of the meetings of the Association, reported that the Governor and Secretary of State had tendered the Hall of the House of Representatives for that purpose.

Mr. Kelley: Mr. President, I move that we accept the Hall tendered us by the Governor and Secretary of State, and adjourn to seven o'clock this evening. Carried.

EVENING SESSION.

CROSS TIES.

The President: Gentlemen, the first question for discussion this evening will be: "Cross Ties, Manner of Laying; What, if Anything, will Take the Place of Wood?"

Mr. Preston: I would like to hear from Mr. Moll on this question. What do you consider the best timber in use for ties?

Mr. Moll: The best we have in our country is white oak, second growth.

Mr. McQuiston: What is the best manner of laying ties?

Mr. Moll: I have never known but one way to lay them, and that is as near square across the track as you can get them.

Mr. Preston: And what distance apart?

Mr. Moll: That depends a very great deal upon the kind of ballast you have. If you have a fine ballast and are running heavy engines, I should say twenty inches from center to center; from eighteen to twenty.

Mr. Preston: Regardless of the size of the tie?

Mr. Moll: Depends to a certain extent, of course, upon the size of the ties. I think ties should be sorted out in the first place, before they are distributed. We buy six, seven, eight, nine, and ten-inch ties, just as they have a mind to get them out. We get a tie occasionally that may be twenty inches wide. I don't think there is anything so damaging to the track or to the rail as to lay two large ties with a small one between. Now, my idea of laying ties would be to sort them before they are distributed and get all your six-inch ones together, distributing the larger ties for joint ties occasionally, whatever are necessary; distribute, for instance, eight and ten-inch ties for joint ties.

Mr. Crippen: What is the best length for a tie for a four-foot-eight-and-a-half-inch gauge — our standard?

Mr. Moll: We use an eight-foot tie; that is our standard tie. We never use any other, but I am sorry to say that a great many of them are only seven feet and a half. I think ties should be squared up at both ends, either chopped square or sawed off, so as to make them eight feet long, to give an equal value.

Mr. McQuiston: In your experience, Mr. Moll, what do you find to be the average life of a white or burr-oak tie?

Mr. Moll: A second-growth, sound white-oak tie will last ten years — average ten years. Sometimes you get one that will last longer, but I should say the average would be ten years.

The President: What would your first growth be?

Mr. Moll: It will not last so long; it is a more brashy timber; it is coarser-grained. I should think the average would be about eight years.

The President: What effect, if any, does traffic have on the life of a tie?

Mr. Moll: I have never found it to have any on white-oak ties on ballast. On a mud track they break in two in the center in the spring of the year when the frost is going out. You take a white-oak tie, and after it has been in six or seven years the tendency then is to break in two. Otherwise, I do not find that the ties are any the worse, whether there is one train a day or ten or twenty, excepting around curves, of course, unless you have braces on the rails so as to hold them in position. If we have to re-spike the track every little while, of course the spike holes eat out the ties, and then some of them will not last over three years; but, outside of that, I don't think traffic affects a good white-oak tie very much, providing they are put in thick enough. The rails will eat into the tie, probably from half to three-quarters of an inch, but it don't seem to hurt the life of the tie any.

The President: In figuring on the average life of a tie, Mr. Moll, what percentage of time would you allow as the difference between stone ballast, gravel ballast, and mud?

Mr. Moll: I could not tell you anything about stone ballast. I don't think I have half a mile of road that is stone ballasted. I find that our soft ties — we have a great many soft ties on my divisions — will last longer in soil or mud-track road than they will in gravel. The only way that I can account for that is, that in the gravel they get wet and dry, wet and dry continually, while in the soil they are wet all the time; but, as I say, they are more apt to break there. We find a great many broken ties before they are rotten — before they would be taken out otherwise, only that they break.

Mr. Crippen: Have you used any cedar ties?

Mr. Moll: Yes.

The President: What do your oak ties cost you?

Mr. Moll: They are charged out to us, delivered, at fifty-five cents apiece; cedars, thirty-five cents, I think.

The President: How does the cedar wear, as regards the price, compared with oak, on tangents?

Mr. Moll: Well, we have only had our cedar ties about three years. My experience is this: that we want a cedar tie fully seven inches thick, while our oak are only six, and I should think they ought to be eight feet any way, and you want them good size in order to get the strength of the tie. If you don't have the size they are apt to break, and, furthermore, the rail eats into them. For instance, we have ties that have been in two years, and you will find the rail bedded down into the tie half an inch, and still the ties are apparently sound as ever. We have not taken out any cedar ties, that I know of, that are decayed.

Mr. Preston: Then you find that in a majority of cases they wear out instead of decaying?

Mr. Moll: Well, we haven't had them in long enough. I think about three years ago we received our first cedar ties for repairing, but we have some track that has been laid four years with 2,640 to the mile, but the traffic has been light on that track so far, with the exception of probably two or three months in the year, and it would not be a fair test as yet.

The President: In your gravel track, about how much does it cost you each year, on the track and put in? How much a tie?

Mr. Moll: Well, the average would be about fifteen cents a tie. I don't think it comes quite up to that, but still they hold to those figures. I have figured it a good many times, and I think it comes up to about ten or eleven cents, but the company usually figure about fifteen cents a tie.

Mr. Preston: Don't you think a small cedar tie is sounder than a large one, as a rule?

Mr. Moll: No, sir, I do not. This year our cedar ties have been much better than heretofore; larger, sounder, and better every way. Mr. Hines, here, has used a good many cedar ties this year. He does not belong to the Association. Mr. Rafferty has used some. Mr. Shattuck, here, has used a good many cedar ties, but he did not use many last year. I think they will all agree with me that our cedar ties are much larger, sounder and better this year than they were last.

Mr. McQuiston: You suggested that there were a great many ties broken — oak ties. In the cases where oak ties are broken, don't you find a great many that break in two in the middle from wrong treatment of the track — their being tamped too hard in the center?

Mr. Moll: Well, I did not say that there were a great many white-oak ties broken. I guess you misunderstood me. Cedar ties, we find a great many broken; not a great many, but we find some; and we find these broken ties all on mud track or prairie soil, bad cuts. The way we account for it is, that the frost comes out under the ends of the ties before it does in the centers, and of course, as our center is rounded up to have the water shed, the frost, coming out of the ends first, leaves them loose, and they break. They hang right by the center, so that the strain all comes on the center of the tie. It would not make very much difference how hard you tamped it—in fact, you have got to tamp your tie clear across if you want to hold the track; if you don't, there is a place for water under your tie. We don't have any of this trouble of breaking ties where we have ballast; where there is gravel or sand.

The President: Can you keep your track in line with cedar ties?

Mr. Moll: Yes.

The President: Around curves?

Mr. Moll: Well, we don't have them on very sharp curves. If the curves are very sharp, if we have cedar ties, we have to brace them. We don't pretend to keep our track on the prairies in gauge.

Mr. Preston: Mr. Moll, in your experience with oak, or cedar, or any other ties that you have on the Milwaukee road, would *you use an eight or nine-foot tie?*

Mr. Moll: I never have had any experience in nine-foot ties. Perhaps a nine-foot would be better. It would certainly give you a longer bearing.

The President: Mr. Wright, what have you to say about ties?

Mr. Wright: Mr. Moll has said all I think it necessary to be said about ties. On the division I am attached to we use altogether white oak. I have no experience with cedar at all, nor any other of those woods.

The President: We would like to hear from Mr. Tripp. He has had some experience in ties.

Mr. Tripp: Yes, some. We have about twelve miles of cedar ties that have been in use five years, and are all right so far. The traffic is very light on them. They show no signs of rotting at all. We also have some oak ties where the traffic is about the same. The rail does not cut into the oak ties nearly so bad as the cedar. We have used some tamarack ties, but they are not nearly so durable as the cedar; but a sound one will hold a spike better.

Mr. Preston: What do you think the natural life of a tamarack tie is?

Mr. Tripp: Six or seven years, probably, depending upon what kind of soil it is in. With a heavy traffic, if it is in sand, six years. We use oak ties altogether on our main line.

Mr. Crippen: What would you think would be the average life of a white cedar on a main line of one of these western roads?

Mr. Tripp: I think it would be pretty short with the rolling stock we have. I think in five years the spikes loosen. We have three hundred cars of freight a day, each way.

The President: Is your track ballasted?

Mr. Tripp: Sand ballast, and it does not hold the ties up well. We have no gravel ballast. I think a tie will last longer in a gravel track than it will in sand. The sand gets hot, and burns out the ties. I think a tie will last three years longer in gravel than in sand.

Mr. Preston: What is the average life of an oak tie; ten years?

Mr. Tripp: Not on an average. Second-growth white oak will probably last that long, but the life of oak ties as they will average is about eight years; cedar, about five or six.

The President: What is the difference in the cost?

Mr. Tripp: A No. 1 white-oak tie costs us fifty cents; cedar, about twenty-eight to thirty.

The President: Then if the cedar tie will last five years, and the oak eight, the percentage would be a little in favor of the cedar?

Mr. Tripp: Yes, except the relaying of them. I don't know but it would be in favor of the cedar tie, anyway; but I don't know how the cedar ties would work where they have this heavy machinery — heavy traffic.

Mr. Preston: The only objection, then, to the cedar tie that you make is as to the cutting in of the rail?

Mr. Tripp: Well, they would not be fit for a sharp curve.

The President: Supposing that could be overcome, you don't claim that a cedar tie would rot out in five or six years, only wear out.

Mr. Tripp: No, wear out; cut down through, the spikes would not hold.

The President: If that cutting down of the rail into the tie could be overcome so that it did not cut any more than an oak one, would it not be a cheaper tie to use and equally as safe, on tangents, anyway, as an oak tie?

Mr. Tripp: Yes, I think it would, if they were hardened or had a plate under them, something of that kind.

The President: In your experience with what little a plate will cost, and the difference in price between an oak and a cedar tie, don't you think it would pay a railroad company to use the plate? The plate never wears out.

Mr. Tripp: In fact, I could not say, not having any experience in it. You would want a half-inch plate.

The President: You are satisfied that if that cutting down could be overcome it would be just as good?

Mr. Tripp: If that cutting could be overcome I think the cedar tie would be just as good on a straight line as an oak tie, and just as long-lived.

The President: Mr. Adamson, what do you use on your line, oak, cedar, or both?

Mr. Adamson: White oak exclusively; no cedar at all. Have never used any cedar. I have had some experience with hemlock. They are short-lived as compared with oak. The life of a hemlock tie *is about three years, and our white* oak seven.

Mr. Preston: About what traffic do you have?

Mr. Adamson: On our eastern division fifty trains a day. Our oak ties cost us from thirty-five to forty cents. We formerly used some black oak, but we have abandoned it. We lay our ties twenty inches from center to center, and require a six and eight-inch face. We calculate on three thousand to the mile.

Mr. Preston: What length of tie do you prefer?

Mr. Adamson: Eight feet, square at both ends, for a standard gauge.

The President: With any kind of ballast?

Mr. Adamson: Yes. I have used nine-foot ties in a six-foot gauge, but not in a four-foot eight.

Mr. Preston: What kind of ballast do you use?

Mr. Adamson: All kinds. Gravel, locomotive cinders and broken rock.

Mr. Preston: Have you ever found anything in your experience that could be substituted for wood, as a tie?

Mr. Adamson: No, sir.

The President: There is a wood that grows down in southern Illinois called catalpa. Have you ever had any of that for ties?

Mr. Adamson: Not on the east end. We are getting the principal part of our ties now from Illinois, Springfield division.

The President: You stated that the average life of a white-oak tie in your country was six or seven years.

Mr. Adamson: Seven years.

Mr. Preston: How long are your winters down there?

Mr. Adamson: They are not as long as they are here. We have about three or four months of winter.

Mr. Moll: That would account for the ties lasting longer in this country than in yours. Our ties here are frozen up on an average about six months in a year, and during the time they are frozen of course there is no decay. I was talking with a Texas roadmaster a while ago, and he told me that their best white-oak ties did not last to exceed five years.

Mr. Preston: Mr. Tierney, have you ever used any cedar ties?

Mr. Tierney: Yes, sir.

Mr. Preston: What is your experience with them as compared with oak?

Mr. Tierney: Where there is heavy traffic on a road, I do not consider them as good as oak.

The President: What would you consider the difference between the Illinois timber and a good, sound white cedar?

Mr. Tierney: The oak would last from two to three years longer than the cedar.

The President: What do you find the trouble to be with the cedar tie, that it decays or wears out?

Mr. Tierney: The rail cuts into it. It does not decay.

The President: Have you had any experience, or do you know anything about a burnetized or prepared tie?

Mr. Tierney: I have seen some of them that had been in use twelve or fourteen years.

The President: What kind of wood were they?

Mr. Tierney: There were some cedar ties that were burnetized and lasted that length of time.

The President: Any hemlock?

Mr. Tierney: I saw some hemlock that were said to have been in use some fourteen years; they were put through some chemical process.

The President: Don't you think it would be more economical to use a hemlock tie, put through this chemical process, if it would last fourteen years, than to use either cedar or oak in its natural state?

Mr. Tierney: A hemlock tie, put through a chemical process and used on curves, I don't think would be very good; it would not hold the rail as well as an oak tie; the rail will cut into it; it don't rot.

The President: In your experience, do you know of either hemlock or pine that was used upon a curve, that caused a derailment direct from the spreading?

Mr. Tierney: I know of no instance where the track spread on account of it. You do not find any hemlock ties on sharp curves in the East.

Mr. Crippen: They claim a cedar tie will cut down from half to three-quarters of an inch. If it does, don't you think that adds just that much to the lateral support of the rail?

Mr. Tierney: Certainly, it helps to hold the rail when it cuts into the tie, that is true enough, providing it don't rot.

Mr. Preston: How long to your knowledge will an Illinois or Missouri oak last as a tie?

Mr. Tierney: Between six and seven years.

THE PRESIDENT: Have you ever used any Michigan or Indiana ties?

MR. TIERNEY: I have used some from Michigan; I find that the Michigan tie is more durable than an Illinois or Missouri tie; the timber is firmer; it is a better tie. That was the case some five or six years ago; late years we don't get quite as good ties from Michigan as we did eight or ten years ago.

MR. PRESTON: How long will a Michigan oak tie last?

MR. TIERNEY: I have seen some on the Chicago & Alton road between eight and ten years.

MR. CRIPPEN: About what was the traffic of the Chicago & Alton road at that time?

MR. TIERNEY: Well, probably eight or ten trains a day.

THE PRESIDENT: What was the ballast they were in?

MR. TIERNEY: There was some cinder ballast, sand; of course they don't last so long in sand, gravel, and some prairie loam.

MR. CRIPPEN: Will an oak tie last as long or longer in the cinder ballast?

MR. TIERNEY: I found they lasted much longer in cinder ballast than in sand. The life of an oak tie in sand will not average over five or six years; it decays from what they call a dry rot. The surface seems to be hard enough, but the center of the tie invariably becomes decayed.

THE PRESIDENT: Do you know what it costs to burnetize a hemlock tie?

MR. TIERNEY: Some claim from ten to fifteen cents a tie.

THE PRESIDENT: Then if the hemlock will last fourteen years burnetized, there is a large percentage in favor of a hemlock burnetized tie as compared with the oak tie of to-day.

MR. TIERNEY: Where there is a light traffic and not many curves.

THE PRESIDENT: Take it on tangents wholly; throw out curves.

MR. TIERNEY: I think so.

MR. PRESTON: Have you taken out any ties that have been in fourteen years?

MR. TIERNEY: Well, I could not say that they had been in fourteen years, but I was so informed by men who knew that they were in use fourteen years.

MR. MCQUISTON: What was the condition of the tie?

Mr. Tierney: It was perfectly solid, but the rail was cut nearly two inches.

The President: Mr. Bowen, have you had any experien with cedar ties, either on tangents or curves, or both?

Mr. Bowen: Yes, both, and oak also.

The President: What do you find the difference betwe the two?

Mr. Bowen: Well, I have cedar ties on sharp curves, ten twelve degree curves, that have been in seven years, and are p fectly sound yet.

Mr. Preston: Do you ever have any trouble in keeping y track in gauge?

Mr. Bowen: None at all.

Mr. Crippen: Do you use a guard?

Mr. Bowen: No sir.

The President: How long will an oak tie last?

Mr. Bowen: I have oak ties in on some of those curves, b they don't seem to be as sound now as the cedar.

Mr. McQuiston: Do your cedar ties cut in much?

Mr. Bowen: Not badly.

The President: About what is your traffic?

Mr. Bowen: Fourteen trains a day.

The President: Do you know what the cedar ties cost?

Mr. Bowen: Cost us twenty-eight cents, and the oak ab fifty.

Mr. Preston: Then your cedar ties will last fully as long the oak?

Mr. Bowen: Yes, I would prefer cedar ties to oak.

The President: On heavy traffic would you prefer them curves?

Mr. Bowen: I would with a guard to the rail, that is, taki into account the difference in the expense.

Mr. Crippen: Have you had any cedar ties in so long t you had to take them out?

Mr. Bowen: Yes, from being cut through—not being actly cut through, but being cut in enough so as to have to ta them out. I have had cedar ties that have been in the track t years and took them out then, and the tie would be perfec sound except the out edges and where the rail had cut in, an was decaying under the rail. The longest that I have ever h any oak ties last me *was eight years.*

Mr. Preston: Your ties are frozen up about how many months in the year?

Mr. Bowen: About six months.

The President: What is the ballast?

Mr. Bowen: Sand.

Mr. Crippen: Did you ever use them on mud or dirt track?

Mr. Bowen: Yes.

The President: Do you have any more trouble with their breaking in the center than you do with oak?

Mr. Bowen: I can't say that I do much; an oak tie will break in the center on mud surface in the spring of the year when your track is thawing out, because it thaws on the edges first.

The President: Where were the oak ties that you used cut from?

Mr. Bowen: They were shipped here from Wisconsin; also cut the ties and made them in Wisconsin, and used them there.

The President: What road do you represent?

Mr. Bowen: I represent the Chicago, Milwaukee & St. Paul, the Iowa & Dakota Division.

Mr. Preston: And on your division you would prefer the cedar ties?

Mr. Bowen: Yes; but I should want to see to the spiking of the ties—oversee that. There is a great mistake made in spiking cedar ties. Cedar ties should always be spiked on the sap; if they are not, they will decay much faster, because the tie is not as solid in the center as it is on the side; consequently, your rail will crowd your spike out, and give the water a chance to get down in there, and your tie will decay. If you spike it in the edges of the sap in the first place, you will not be troubled with it.

The President: Have you ever had any cedar ties laid in a side track, or any place where they laid until they did become decayed so that you had to take them out?

Mr. Bowen: Yes.

The President: How long did they lie there?

Mr. Bowen: They were in when I took charge of the track, and I was informed that they had been in there six years, and I had charge of the track about four years, and took them out, and the centers of those ties were sound—might be probably four inches in diameter that was sound; the balance of them was decayed shelled right off.

The President: Mr. Downing, you have used a great ma cedar ties, I know.

Mr. Downing: Yes, we have used some.

The President: What, in your experience, is the life of cedar tie as compared with an oak one?

Mr. Downing: I think the life of a cedar tie is far beyond oak one. I had some experience in the East with cedar ties l ing right in a wet cut, and they lay there for thirteen yea before they were removed, and they were pretty nearly as sou as when put in, with the exception of a cut about two inch deep, caused by the rail. They had been wet all the time.

Mr. Crippen: Was there much traffic over it?

Mr. Downing: From fourteen to sixteen trains a day.

The President: Did you have any oak anywhere near tha

Mr. Downing: They don't use any oak there; they u cedar, hemlock and spruce.

Mr. Crippen: How is the hemlock as to durability as co pared with the cedar?

Mr. Downing: Hemlock there will last about three yea second growth, three or four years; spruce, about a year.

The President: Then you take a hemlock tie that wou last three years, and if it could be burnetized for fifteen cen and last thirteen years, which would you prefer, that or a ced tie in its natural state?

Mr. Downing: I think I would prefer a hemlock tie burne ized. It would hold a spike better, and the rail would not c into it so badly.

The President: What is your experience with oak in t western country?

Mr. Downing: Well, the oak ties that I have had any exp rience with are very poor; they came from Missouri, and so of them have a life of three years and some of them six.

Mr. Preston: Did you use any cedar ties in connection wi those when they got about the same amount of wear?

Mr. Downing: Yes. We have but very few cedar ties the track now. I think we put in four thousand one season, d tributed along on the tangent; none on the curves.

The President: Mr. Downing, if you had four thousand t to put in, and two thousand of them were cedar and two thousand oak, which would you prefer to do: put the cedars all together or mix them with the oak?

Mr. Downing: I would put them all together, because I think they would make a better track. You put two oak ties and a cedar between them, and you will feel that the rail gives under you in passing from the oak on to the cedar and up on to the oak again; you will feel it in the motion of the car, and I think it is apt to bend the rail, too, because the oak is so much more solid than the cedar.

Mr. Preston: When it comes winter, how does the frost operate on the two?

Mr. Downing: I think one would freeze just as hard as the other; at the same time the rail would cut into the cedar tie more than it would into the oak.

The President: Don't you believe that a cedar tie would freeze and expand a good deal more than the oak tie? Wouldn't it naturally absorb more water?

Mr. Downing: Well, it would, because it is softer material; that would be the only reason.

The President: What do you believe to be the proper length for ties for a standard gauge?

Mr. Downing: I think eight feet long, if you get them eight feet. We don't get a great many of them eight feet.

The President: We would like to hear from Mr. J. H. Preston. What do you use on your division?

Mr. Preston: Mostly oak; white and burr oak. Have used some cedar.

The President: What do you find as to the life of the two, cedar and oak? As to their decaying qualities?

Mr. Preston: On my division we are using the oak ties entirely for the main line, and on the branches we are using cedar. As near as I can determine, say taking ten years as a criterion, I find that the life of the white and burr-oak tie has been between eight and nine, hardly up to nine years. The cedar tie has averaged on our branches — we use cedar there almost entirely on my division — about seven years. In side tracks, however, on the main line, we have used a great many cedars, I think two-thirds of them, and these in side tracks will last longer, but I don't think that a white-cedar tie — that is, the quality of timber we have got — will last longer than seven years, and between eight and nine for an oak.

The President: Do you mean that the cedar tie decays in about seven years, or wears out?

Mr. Preston: It is about equally divided; about one-half decay, and the other half the cutting of the rail into the tie. My opinion is, that the chafing of the tie from the rail, has a great deal to do with the life of a cedar tie, particularly where you have a heavy traffic; the rail cuts down into the tie, and the water of course gets into the timber a great deal easier; and I think perhaps the expansion from freezing where cedar ties are badly cut has something to do with spoiling or destroying the fiber of the timber. Now, so far as oak ties are concerned, a hewed oak tie will last longer than a sawed one; we know that by experience.

The President: Take for instance the same stick which is hewed, and saw it, or take one stick of timber and hew a tie out of it and take another tie of the same stick and saw it, do you believe then that the hewed tie will last longer than the sawed?

Mr. Preston: I believe that two ties of the same tree, one being sawed and the other hewed, and put into a track under the same conditions in every respect, the same traffic, that the hewed tie will last two years the longest.

The President: Why do you make that statement?

Mr. Preston: From the very fact, that you take a stick of timber and saw it, and you destroy the fiber of the timber, you rough it up so that the water and atmosphere act upon it much quicker than they do on a hewed stick.

The President: Suppose you take the sawed tie and the hewed tie off from the same stick, and you take a plane and plane the sawed tie off smooth; which will last the longest.

Mr. Preston: I don't think there would be much difference, if you cut off the destroyed fiber of the sawed stick. It won't make any difference, I don't see how it can.

The President: Don't you find on all the hewed ties you get, what are commonly called calf marks of the axe? Not hewed smooth; and they are liable to, and will hold water until it naturally evaporates?

Mr. Preston: That is true, but it is a clean cut; it is cut right off with an edged tool, while you take a saw, and the saw running through a stick of timber, no matter whether it is oak, pine, hemlock or any kind of timber, destroys the fiber for an eighth of an inch in from the cut of the saw, always. Now that is left on a sawed stick and gives the atmosphere a chance to work on it.

THE PRESIDENT: I always made up my mind that the reason that our sawed ties didn't last any better was, that they were sawed out of timber that neither could be split or hewn, they were so knurly and twisted.

MR. PRESTON: Well, that is so to a great extent.

MR. SWINNEY: I have had considerable experience in that. I was a tie inspector before I was a roadmaster, and there is considerable in following the fiber. You know the pores in wood run lengthwise of it, and where you have a split or hewed tie, it follows that fiber, and where you have a tie sawed out, it more often crosses the fiber, or crosses these pores in the wood, than it does in a split stick.

THE PRESIDENT: Then according to your theory, a split tie would last longer than a hewed one?

MR. SWINNEY: Well, a split or hewed; it is virtually the same. You have to use a broad axe to smooth up a split tie.

THE PRESIDENT: Mr. Richards, you use oak ties altogether, do you?

MR. RICHARDS: Nearly all, a few wild cherry. We use a Pennsylvania tie, eight feet long, cut square.

THE PRESIDENT: Is the bark taken off before they are laid?

MR. RICHARDS: Yes, but we take it off. We buy them with the bark on; prefer to buy them that way.

THE PRESIDENT: What do you consider the difference, taking the bark off the tie before you lay it, or letting it rot off by the lapse of time?

MR. RICHARDS: I don't know as there would be much difference in the durability of the tie, but there would be a good deal of difference in the tamping of the track.

MR. PRESTON: What do you consider the life of a cherry tie?

MR. RICHARDS: We consider them just as good as an oak, if they are second-growth cherry; pay the same price for them, but in large timber they are not as good, that is, there is a dry rot in them down there. I don't know if they were perfectly sound how it would be. We never used any cedar to amount to anything.

The President: They use a nine-foot tie on your road in some places, don't they?

Mr. Richards: Not that I am aware of. They do on the New York, Pennsylvania & Ohio, or at least they used to, I think they do yet.

The President: What road do you represent?

Mr. Richards: The Lake Shore.

Mr. Preston: Mr. Sloan, do you use any cedar ties?

Mr. Sloan: Yes, we have several thousand that were laid before I came on to the road. I have been with the road five years.

The President: What is the traffic?

Mr. Sloan: From twenty to twenty-four trains a day.

The President: What is the condition of the cedar ties now?

Mr. Sloan: They are good; not cut in very much.

Mr. Crippen: Do you use them on curves, too?

Mr. Sloan: Yes; our curves are very light.

Mr. McQuiston: Do you have any trouble in keeping it in gauge? ever have to respike it?

Mr. Sloan: No, sir; not if you spike your cedar ties on the outer edge, in the sap.

The President: How many different kinds of ties have you in use?

Mr. Sloan: I have oak, black walnut and cherry.

The President: How are the black walnut?

Mr. Sloan: They are very good. I would prefer them to white oak, but if you lay them out on the ground and let the sun shine on them, they will split.

The President: They don't split after they are in.

Mr. Sloan: No; cherry splits the same. Our white and burr oak has an average life of from five to seven years.

The President: If a cedar tie will last as long as an oak, would you prefer to lay it?

Mr. Sloan: I would prefer a cedar tie to an oak. I helped lay some on the I. B. & W. thirteen or fourteen years ago, and they are in there yet. We laid them on sharp curves; hemlock, cedar, and white and burr oak.

The President: Oak at the same price as cedar, no doubt you would prefer the oak.

Mr. Sloan: No, I would still prefer cedar.

Mr. Preston: How thick do you put them in?

Mr. Sloan: I put about 3,100 to 3,150 to the mile. Make them about ten inches apart, a 6×8 tie; nothing less; and we very seldom get over 6×9, mostly hewed and split ties. I find in laying split ties, that by laying them with the sap down they last a great deal longer.

The President: In your cedar ties, what size do you prefer?

Mr. Sloan: I would prefer an eight to ten-inch tie. I would not care much about taking ties over that, for they are mostly hollow in the middle.

The President: Did you ever get any of those big wide ones?

Mr. Sloan: Yes, and they last very well, by spiking them out on the outer edges.

Mr. Preston: How would you recommend the spiking of a cedar tie?

Mr. Sloan: Right on the edge, where it strikes the sap.

The President: Speaking about spiking your ties, how would you set your spike?

Mr. Sloan: I would set it, say two inches in toward the center. Keep out of the center. We have taken out some few since I have been there; they commenced taking them out and putting in oak, and I stopped them. I would prefer the cedar.

The President: If you were going to have cedar and oak, would you prefer to put them together or separate?

Mr. Sloan: I would prefer keeping them separate. I think they make a better track when they are kept separate. An oak tie is pretty solid, and where you mix them in with cedar the rail will not give as much where there is an oak tie as it will where there is a cedar.

Mr. McQuiston: You use a good many split ties, I believe.

Mr. Sloan: Yes, and I put the round side down. I think it gets a better bearing, and I can keep the track up better. Where you put it with the narrow side up the tie always turns edgewise.

Mr. Preston: I move we adjourn until tomorrow afternoon, directly after the excursion returns from Minneapolis. Carried.

SECOND DAY'S PROCEEDINGS.

Thursday, September 16: At eight o'clock the members of the Association took a special over the Chicago, Milwaukee & St. Paul to a point fifteen miles west of Minneapolis, to view the workings of the American Railway Ditching Machine. After witnessing the operation of the device to their satisfaction, the party returned to St. Paul at one o'clock P.M.

AFTERNOON SESSION.

RAIL JOINTS, FASTENINGS AND NUT LOCKS.

The President: Gentlemen, the question of rail joints, fastenings and nut locks is the next under discussion. We will hear from Mr. Moll on rail joints.

Mr. Moll: I know very little about nut locks, except those we are using.

The President: What is the best rail joint that you have used and are using now. The angle bar or fish bar?

Mr. Moll: The angle bar is of course a much stronger joint than the fish bar — the straight bar; at the same time I am not in favor of two ties under a joint. I am in favor of a good large joint tie directly under the joint. My experience is, that joints put up with angle bars suspended after there has been considerable traffic over them, the end of the rail seems to bend down; it does not make a smooth, perfect road, and there is no way that I have ever found that I could get the joint back, get them to stay up straight, while with the joint tie directly under the joint, there is a chance to do it by tamping the joint tie harder than you do the shoulder tie intermediate, or tamping the joint tie, and not tamping the shoulders at all, allowing them to hang loose for a day or two, until they have sprung back, watching them closely.

The President: If you could have a joint tie under the joint as well, with the angle bar as is now used upon a good many roads, would you prefer the angle bar then to the fish plate?

Mr. Moll: The angle bar looks badly sticking out at both ends of the tie, to me. I should say with a tie under the center, if the angle bar was made a little different shape, having the angle on the tie only, it is possible it would be better; the angle bar acts as a brace, keeps the rail from turning. In that way, it would be better, in my opinion, than a straight splice, especially on curves.

Mr. Preston: How long is the angle bar that you are using now?

Mr. Moll: We have them different lengths, twenty inches and two feet.

The President: Take the angle bar that you now have, two feet, how much additional length would you have to have put on to it to use a joint tie, and still get your angle bar upon the two shoulder ties?

Mr. Moll: Well, that is easily figured; three ties put ever so close together would certainly consume a space of about thirty inches.

The President: If you use a two-foot angle bar, then would you not recommend the additional six inches in length in order to make a joint with a joint tie directly under it, and still let the angle bar reach the shoulder ties?

Mr. Moll: It has occurred to me that that would make a very good joint, still, I have never seen it tried and I could not say. The angle bar being so long, it might bend if your shoulders were weak. I spoke to one of the members here this morning in regard to that very matter, thinking it would make an elegant joint to have the angle bar long enough so as to have three ties in place of two, one under the joint and one for each shoulder. My experience has been that I can make a smoother and better siding track with the fish-bar joint than I can with the angle bar.

The President: And you claim that the cause of it is wholly the suspended joint?

Mr. Moll: Yes.

The President: Did you ever make any test to tell the difference in strength between an angle bar and a fish plate, or know of any being made?

Mr. Moll: No, sir.

The President: I will say this: I received a letter from the Chief Engineer of the Pennsylvania road, who stated that they had made a test, and that a fish-plate joint (all bearings being twenty inches) took a permanent stay at 30,000 pounds, and the angle bar broke at 79,000 pounds; Sampson angle bar, patent, broke at 68,000 pounds.

MR. MOLL: Our company had a bridge washout, I think it was 130 feet long, angle-bar splices on the bridge, and the rails staid there — the ties staid there, and they made a roadway over that bridge and carried the passengers over — they walked over, rather, and carried the baggage over. This was some four years ago, on the Hastings & Dakota Division. I think it was 132 feet, and the angle bar never gave way. We had a washout last summer, the engine ran into the washout, the rails were sixty-pound iron rails (sixty pounds to the yard); the rails had been laid the winter previous — this occurred, I think, a year ago last June. The rails broke, but did not break the angle bars; but my opinion is that, for a joint fastening, the angle bar is not a success the way we have it. Then, again, if you have a slot on the angle bar it weakens it so that you might just about as well have a straight splice, because it cuts away the strength right where it is needed. I saw, on the Wabash road last spring, a great many broken angle bars; they were all slotted in the center with a joint tie under the center. They were not as large an angle bar as ours; a narrower angle, so that the slot that was taken out of the angle bar — there was just enough left to allow the spike to come against the rail and angle bar together. It occurred to me then that taking that out of there on each side of that angle bar right at the center, right where the bend is, it would break it.

THE PRESIDENT: Don't you think that the form of an angle bar, when properly spiked, has a greater tendency to hold the rail from moving? We know that it has a greater tendency to hold the rail from moving, because you get four spikes in it, where you have a suspended joint, whereas if you have a joint tie you only have two to keep the rails from creeping.

MR. MOLL: Oh, certainly. We have no trouble at all with track creeping anywhere,—on the grades or anywhere else,—with the angle bar, where every joint is properly spiked, unless it is in cases in a sag, where the road bed is soft, or something of that kind, the rails are bound to run together in spite of all you can do. There, of course, we have some trouble, but not very much; not nearly so much, I think, as we have with the straight bar.

MR. PRESTON: What nut lock do you use?

MR. MOLL: We use the Verona. The Verona is now the standard, although every little while we get a few of some other kind, sent us to try. We also have the Pratt nut lock. The Verona is the best, by all means, in my opinion.

The President: Do you know what the difference in the cost is?

Mr. Moll: I don't know what the Pratt costs. I have never seen the bill. The Verona costs, I think, about ten cents a joint. We also have the Fibre. The Fibre is not a success.

The President: I think the Verona nut lock costs $20 per thousand.

Mr. Moll: The price must have been very much reduced, then.

Mr. Kelley: I think that is what they cost.

Mr. Bowen: They cost us $20 a box, one thousand in a box.

Mr. Moll: We also have a wooden splice; I think it is about an inch thick.

The President: Wooden splice, or nut lock?

Mr. Moll: A nut lock, ¾ of an inch thick, which goes on outside of the angle bar, and then an iron plate outside of that, the whole length, about ⅛ of an inch thick, I should judge. Mr. Hines could probably tell you what success he has had with them. On the division that I used to run, they sent me at one time five miles of wooden blocks, ¾ of an inch thick, without any iron plate, two of them to a joint, one to each rail, with two holes in, made out of white oak, soaked in oil. I never found any trouble in keeping the bolts up tight with them. They were very noiseless, and I considered they were a success. Those certainly did not cost much, as they could be made in the shop out of scraps.

The President: What is your experience with the vulcanized fiber?

Mr. Moll: They crush out — crush to pieces — is one thing against them, in tightening up the bolts. The tendency is for trackmen to tighten up their bolts in rainy weather, and it is just the time they should not touch them; and furthermore, if you want to change the rail, it is almost impossible to get it off of the bolt, and if you want to use it again, you can't get it on. The hole is shrunk together so small that you can't use it a second time without a great deal of trouble and work, and then it seems to me that they act only as a washer. There is no spring to them, and I think in order to have a successful nut lock, you want something that presses against the nut continually, which the Verona does, and, I suppose, the Pratt. I have not had any experience with the Pratt washers, excepting with those we have received this fall on our extension. We have, I think, about twelve miles there of the Pratt.

The President: Mr. Adamson, what rail joint do you use?

Mr. Adamson: We are using the angle plate. We are not using any fish plates at present.

The President: Do you make a suspended joint of them?

Mr. Adamson: As a general thing, we are putting the tie under the joint.

The President: How do you spike your track, then? Do you have the angle bar punched against the center?

Mr. Adamson: No; we are putting them together where we possibly can, and spiking them; if not, they are going unspiked.

Mr. Preston: What nut lock do you use?

Mr. Adamson: We are using this vulcanized fiber. I have had experience with it four or five years, and we use both the Pratt and Verona, also. I prefer the vulcanized fiber, where care is taken to put it on before it gets wet or damp. I put them on and experimented with them; did not touch them for two years, with a good deal of tonnage over them, and they appeared to be perfectly tight still. There has to be great care taken that they do not get damp and swell before they are put on, but I prefer them to the Verona.

Mr. Moll: Do you have any trouble if you want to change your rail and have to take them off, in getting them back again?

Mr. Adamson: No, sir, I have never experienced any trouble, or had any complaints of that nature.

Mr. Preston: How many of those vulcanized fiber washers have you used?

Mr. Adamson: I expect I have ten miles in at present; have had some in five years. None of them have given out.

Mr. Preston: I understand that the manufacturers of this fiber washer make the claim that there is no danger of jamming the thread back of the nut if they are used. Is there anything in that? Does it protect the thread on a bolt in any shape?

Mr. Adamson: No, I think not. I don't think I have found anything better than the Verona nut lock for preserving the thread of the bolt.

Mr. Preston: Are you using these fiber washers entirely on an angle bar?

Mr. Adamson: On an angle bar; yes, sir.

Mr. Preston: Have you ever tried any of them without this iron washer on the outside?

Mr. Adamson: No; we never use them without an iron washer.

Mr. Preston: Do you put one between the washer and the fish plate or angle bar?

Mr. Adamson: No; we put the washer right by the angle bar, and then the thin washer between the vulcanized washer and the nut.

Mr. Preston: In other words, you use two washers.

Mr. Adamson: One washer only.

Mr. Preston: Well, do you put your fiber washer right next to your angle bar?

Mr. Adamson: Yes; we just have the fiber washer and the thin iron washer, and we put the fiber washer near the angle bar and then between the nut and the vulcanized fiber we put this thin washer.

Mr. Preston: Do you know what the cost of the fiber washer is?

Mr. Adamson: No, I don't recollect.

The President: Mr. Moran, what rail joint do you use?

Mr. Moran: We use the angle bar, and the fish plate also. The angle bar is the best.

The President: Do you make a suspended joint?

Mr. Moran: No sir; it is a twenty-inch angle bar with a tie under the joint.

Mr. Preston: Is your angle bar slotted?

Mr. Moran: It is; slotted at the angle, not opposite each other because it varies a little.

Mr. Preston: It is so you can spike them into one tie?

Mr. Moran: Yes.

The President: What would be your opinion in regard to lengthening that bar enough to take two more ties?

Mr. Moran: I don't think it would help it any, because the strain is about ten inches from the end of the rail; that is as far as the strain would be if you made it three feet.

The President: Do you use a nut lock with them?

Mr. Moran: Yes; we use the Verona, two sizes. We have used the Pratt. We have not used any for the last two years. We are getting out of them. The Verona is the best.

The President: Have you used any of these vulcanized washers?

Mr. Moran: No.

The President: The gentleman who represents the Verona nut-lock is here, and can give us the prices.

The agent of the Verona stated that the approximate cost of their nut lock was $25 per thousand; that they had three or four sizes, really all the same price.

Mr. Moll: The trouble that I found with the first Verona nut-lock that we had was that we would occasionally have a loose joint—loose bolts. The reason of it was, because there was not sufficient spring between the two points. There was very much less opening there (referring to nut lock exhibited by agent).

Mr. Moran: These shoulders are not large enough to fill the slot in the plate; the hole in the plate is too large for this; they don't make a shoulder large enough, and it turns.

Mr. Moll: There is one trouble I have found with the Verona. We will say our rail runs right along here (illustrating with nut lock). Now, the holes in the fish bar are oblong, and you get this into one of those holes, and it should stand either up or down, one of the two. If it stands sidewise, and then goes into the hole you lose one-half of the strength.

Mr. Moran: A little caution to the men is all that is necessary.

Mr. Moll: You can't hold it without a tool.

Mr. Moran: We do.

Mr. Moll: We have made a tool to hold this on some of our divisions, either up or down.

Mr. Bowen: I have a tool made to hold that up.

The President: Mr. Cox, we want to know your opinion in regard to rail joints. Which do you prefer, the angle bar or fish plate?

Mr. Cox: I like the angle bar the best.

The President: In using the angle bar, do you make a suspended joint fit?

Mr. Cox: Yes.

Mr. McQuiston: Have you any double track on your division?

Mr. Cox: No, sir. If we had double track I should say the angle bar would be altogether preferable, because if iron runs it goes with the traffic. We had a very heavy traffic west, and our iron kept traveling that way with the common fish plates, and they were spiked only in one tie. When I came to lay the angle bar and spike two to a joint, it stopped the creeping entirely.

The President: Have you used any of the angle bars with a joint tie directly under the joint?

Mr. Cox: I never have. We used them with a suspended joint.

Mr. Preston: Do you find any trouble with your rails kinking at the ends?

Mr. Cox: I have never had any. I have only sixty-eight miles of them on my division.

The President: How long has that been laid?

Mr. Cox: That was laid last year, all of it, that is, nearly all, but I took the precaution to have it done just as fast as laid. I had five or six men right behind the track layers, and I put the joint ties in after it was laid; kept them right up with track layers. We surfaced up every bit that was laid, everything to a face; every joint tie was tamped with a tamping bar and the balance with shovels, and I have had no trouble. My joints stay up well. but there is one thing more. I have had an idea, and I think I am right about it, that if I had my way I would have a tie under the joint, and I would have an angle bar long enough for three ties. I think the joint is the weakest part, as a general thing, on track; that has been my experience, anyway.

The President: What nut lock do you use?

Mr. Cox: We use the Verona nut lock. I have never used the Pratt, or anything but the Verona excepting a few just to try them, and I did not like them. Never paid much attention to them. We have used the Verona two or three years. Used them on the common fish plate. Before that we ran our road without any.

The President: Have you taken any of them off in relaying your track?

Mr. Cox: Yes, and as a general thing they were all right.

The President: With what we call an oval head bolt for the angle bar, do you have any trouble with the bolt turning, either because the hole in the angle bar is too large or the bolt is too small?

Mr. Cox: If the bolt is made to fit the angle bar, the angle bar is supposed to hold it, and it does. I have had no trouble in screwing up my joints with it; no trouble at all, but I don't like those nuts (hexagon); I would rather have a square nut, and we get these made a quarter of an inch wider. I prefer a square nut on account of the wrenches. Have never used any steel wrench. We can use a square nut with this nut lock. This nut lock was made on purpose for our road, in order to use them. We experimented on it.

The President: Mr. Hayward, what joint fastening are you using on your line or division in the way of a plate?

Mr. Hayward: We are using the plain fish bar, and some angle bars. We have used angle bars about three years.

Mr. Crippen: Do you prefer the angle bar to the common fish plate?

Mr. Hayward: Not the kind that we are using. These are the 22-inch. The slot is cut in the center. They are not the Sampson bar. We use a joint tie right under the joint. I find about fifty of those break to one plain splice. I account for that from the fact that the slot hole is cut right where the strength is needed. I have never used any longer ones, that is, using two ties to a joint.

The President: How many bolts do you put in?

Mr. Hayward: Four. That angle splice is only about the same length as the common fish bars, and in regard to the joints, I find the joints get down; we cannot keep them up. With the plain splice I could, because if it got a little bent, I took it off and turned it over and had an arch. I had a stronger splice than before.

Mr. Preston: What nut lock do you use, if any?

Mr. Hayward: We are using the Verona nut lock. Have used it for the last three years. We have used some of them before.

Mr. Preston: Ever used any of the Pratt?

Mr. Hayward: Yes; we found the Pratt a very good nut lock for six years; at the end of six years it was entirely worn out; had to change the whole of them.

The President: What seemed to be the trouble with it?

Mr. Hayward: You could not tighten it up.

The President: Did you ever use any of these fiber washers?

Mr. Hayward: Yes. We did not like them at all. The finest grip bolt that I have ever seen is the Harvey grip bolt.

The President: Will the Harvey grip bolt hold your joint tight?

Mr. Hayward: Yes, sir. In all of that seventy-five miles, and some of it has been laid a little over seven years, you can't find one joint in five miles that is loose, and that is laid with the common plain fish plate on a mud road.

The President: And you have never had any occasion to tighten them?

Mr. Hayward: Oh, yes; I did not say that, but it was not like the others. You don't find loose bolts in it. You don't hear the bolts rattling as you ride over it. For the last three years we have been using the Verona, though, entirely. I find the Verona nut lock next to the Harvey.

The President: Then in your experience, if you could have your choice, you would take the grip bolt in preference to any nut lock.

Mr. Hayward: Every time, sir.

The President: I suppose you don't know the cost of them.

Mr. Hayward: Yes, sir. The last Harvey grip bolts that we bought were four cents a bolt, making sixteen cents a joint. You take the common bolt, and you have to buy the nut lock besides, and it makes a little dearer joint. I believe the Harvey costs about one cent apiece more than the common bolts, but they are a cheaper joint than the Verona nut lock, counting the cost of the bolt in.

Mr. Crippen. Have you ever taken off the Verona nut lock after it has been in, say four or five years?

Mr. Hayward: Yes.

Mr. Crippen: Does it retain its elasticity?

Mr. Hayward: It does, except in a few exceptional cases. I found it just about as good as at first. I don't think I have seen half a dozen yet, and there are not many in the road but what have been just as good to use the second time.

The President: What kind of a nut do you use?

Mr. Hayward: A hexagon nut. I prefer the square nut, but we could not use it on our angle splice; the rail was not deep enough, only a four and one-sixteenth rail, and you can't use the square nut with it. Of course on a high rail you can use it. I use a steel wrench altogether.

THE PRESIDENT: Mr. Brennan, on your road are you using angle bars and fish plates, both?

MR. BRENNAN: Yes. We have used the angle bar about four years. I think it makes a firmer joint, a stronger joint, while I agree with Mr. Moll that being a suspended joint the rails bend down a little at the end and make an uneven surface.

THE PRESIDENT: What make of rails have you got that give you that trouble?

MR. BRENNAN: We have a steel rail manufactured by The Chicago Rolling Mill, and three or four other different kinds.

THE PRESIDENT: Have you any Joliet steel?

MR. BRENNAN: Yes; I find that works in the same way exactly.

MR. PRESTON: Do you prefer a tie under the joint?

MR. BRENNAN: Yes; I think it makes a more solid joint, and would hold in the surface better.

MR. PRESTON: What nut lock do you use with them?

MR. BRENNAN: We do not use any, with the exception of a few that we have put in as an experiment. I have seen nut locks in use before I came on to this road, and I think the Verona is the best that I have seen. I have seen that Pratt used. Never used any myself.

THE PRESIDENT: Which do you prefer in laying these angle bars, or any other bar for that matter, the hexagon or square nut?

MR. BRENNAN: I don't know that there is any material difference. I don't know that I should have a preference.

THE PRESIDENT: You don't think there is much difference, but if one was cheaper than the other you would take the cheaper.

MR. BRENNAN: Exactly.

THE PRESIDENT: Mr. Sloan, do you use the angle bar and fish plate, both?

MR. SLOAN: We use both; we have used the angle bar about seven years, and have used fish plates at the same time, where there was nearly the same amount of traffic, and I find the angle bar the best. I do not find any difference about the rail kinking at the end. We put the ties about six or eight inches apart, where we lay a suspended joint.

THE PRESIDENT: What nut lock do you use?

MR. SLOAN: We use the Verona, Pratt washer and this fiber washer.

THE PRESIDENT: Which would be your preference?

MR. SLOAN: The Verona; I have about forty-five miles of Pratt washers, and about 150 miles of Verona nut locks.

THE PRESIDENT: If they were all the same price, would you take the Verona for a choice?

MR. SLOAN: Yes.

THE PRESIDENT: Do you use a hexagon or square nut?

MR. SLOAN: We use square nuts with Pratt washers, and hexagon nuts with the Verona.

THE PRESIDENT: Which do you prefer?

MR. SLOAN: I don't know as there is much difference, with good wrenches. We use steel wrenches.

MR. PRESTON: Do you have any trouble with the hexagon nut?

MR. SLOAN: With iron wrenches, the wrench slips, but with steel we have no trouble, and not much with iron, when we tighten them up well in the first place.

THE PRESIDENT: Mr. Gillinau, how many different kinds of joints have you in use on your division?

MR. GILLINAU: I have quite a good many, I have as many as half a dozen different joints; the common splice, the Sampson angle splice and the plain splice.

THE PRESIDENT: And the Sampson angle bar, too?

MR. GALLINAU: Yes, and some Cleveland splices and some Chicago splices. We get our splices wherever we get our steel; the same factories.

MR. PRESTON: Which do you find gives you the best satisfaction?

MR. GALLINAU: Well, the angle splice in a good ballast I think is very good—the best, but I have some angle splices in a mud track, and they are breaking.

MR. PRESTON: Breaking the angle bars?

MR. GALLINAU: Yes, the angle's breaking.

THE PRESIDENT: Do you lay them with a suspended joint?

MR. GALLINAU: Yes; we have to spike double, and the rail will go down and break a joint in a mud track, but in gravel or stone it seems to work very well.

Mr. Preston: Do you have any trouble with your common fish plates in a mud track?

Mr. Gallinau: No, not where we have a tie under the joint.

Mr. Preston: What nut lock do you use?

Mr. Gallinau: The Verona altogether, except we have a few of the Pratt for a sample, but I do not like them. We had some four years, and took them off, and they all came to pieces.

The President: Which do you use, a hexagon or square nut on your angle bars?

Mr. Gallinau: A hexagon nut.

The President: Have you any choice between a hexagon and a square nut?

Mr. Gallinau: In some respects, yes; we can't use the hexagon very well on the angle splice, but in using them I have a steel wrench on the other end of my common wrench that I use for the square nut, a small steel wrench, which I use for the hexagon, and I have no trouble.

The President: Mr. P. J. Kelley, please tell us your experience with rail-joint fastenings, the angle bar, fish plates, etc.; which you consider the best.

Mr. Kelley: I do not use any angle bars, and do not want them. I use fish plates altogether.

The President: Did you ever use any of the angle bars?

Mr. Kelley: A few.

Mr. Preston: What is your objection to them?

Mr. Kelley: Well, I prefer to have one joint tie, and that should be under the joint. I think you can tamp up one joint tie much better than two, especially on a mud ballast. I think, take it on a stone or gravel ballast, that almost any kind of a tie would be sufficient with a good splice. I think that an angle splice would be stronger, providing you used one tie. I would prefer one tie to two for a joint.

The President: Do you not find in your experience that in your rails wearing, particularly steel rails, when they do give out, it is altogether at the joint?

Mr. Kelley: I think the joint is the weakest part of the rail. I think where you are trying to tamp up two joint ties, you should get them as nearly equal as possible on a solid basis, and it is almost impossible to do it with two ties on a mud ballast.

The President: Mr. Rafferty, you use fish plates and angle bars both on your road?

Mr. Rafferty: That is about all I have on my division, angle bars and fish plates. Have used the angle bars six years. Have used fish plates longer than that. I find that the angle bars give satisfaction. I use them with a suspended joint.

The President: Did you ever lay common fish plates with a suspended joint?

Mr. Rafferty: No, sir.

The President: Did you ever have them get suspended after you did lay them?

Mr. Rafferty: Yes, I have.

The President: Do you discover any depression of the rails in your suspended joint?

Mr. Rafferty: Yes, sir; the rails are beginning to batter. I think they would be better with the tie under the joint. The only advantage I claim for the suspended joint of the angle bar is on account of the creeping.

Mr. Crippen: How long has the steel been laid?

Mr. Rafferty: I think it has been in about six years.

The President: About what is the traffic of your road?

Mr. Rafferty: Well, at this place I speak about, there is a pretty heavy traffic. It is a grade of five miles, and the heaviest locomotives that we have only pull seven cars up the hill; that is a load for them, and the traffic of the road accumulates there.

The President: Do you believe if you had had a solid joint tie, that the steel would have been any better than it is now, with six years' wear?

Mr. Rafferty: I think, with the ballast we have, there would not have been any difference. We have a good solid ballast. I think where you have a good solid ballast, one joint holds about as well as the other.

Mr. McQuiston: What distance do you place your ties apart?

Mr. Rafferty: I place them so that the outside of the angle bar will take the largest half of the tie.

The President: In laying a suspended joint, do you make any difference as to laying one tie closer to the joint proper than the other, or do you just about divide the space?

Mr. Rafferty: Divide the space about equally.

The President: In this rail in which you discover this battering, isn't it almost invariably the rails that are on what we call the lower side of the grade; the upper end of the rail on the down grade?

Mr. Rafferty: I never noticed that there was any difference. I never took particular notice whether it was on the down grade or the up grade that the most batter would be; but last September I put in some ties right under the joint for a test; I also put in some suspended joints right in the same place, and I cannot find that there is any difference in regard to the wear of either of the joints, and in fact I do not consider it a fair test, because it is good, solid, gravel ballast, and one joint seems to hold as well as the other.

The President: What nut lock do you use?

Mr. Rafferty: The Verona; we have some of the Pratt. I have not had enough experience with the Pratt to know exactly what they will do. The first I ever used them was last September; I used three miles of them, and they have not been touched since they were put in.

The President: Have you ever used this fiber washer?

Mr. Rafferty: Yes, but I do not like them; the difficulty with them is that they do not keep the bolt tight.

The President: Can you give any reason why they do not keep the bolt tight?

Mr. Rafferty: I do not know, unless there is a shrinkage in the washer, and the nut has no way of catching on there. It seems to slide around, and it gets loose. There is a jar of the joint every time a train goes over it; there does not seem to be any spring to it.

The President: A train passing over your track, ballasted in any manner, the best track you have, don't you find, if standing and looking at it, that the rail is all the time in a light move?

Mr. Rafferty: Yes, that is so.

The President: Will not that naturally cause a wear between the plate and the rail, not to any great extent, but a continual wear?

Mr. Rafferty: Yes, I think it will; and also between the nut and the plate; and between the head of the bolt and the angle bar, too.

The President: Then in order to make a nut lock, you want something that will take up that wear as it progresses, I suppose.

Mr. Rafferty: Yes, that is just what I think is required.

The President: And this (vulcanized fiber) does not do that?

Mr. Rafferty: No, sir.

The President: Do you use a hexagon or a square nut?

Mr. Rafferty: We use the hexagon nut, but have used square nuts also. I do not know as I have any preference.

The President: Mr. Mayer, what do you use? Angle bars, fish plates, or both?

Mr. Mayer (St. Paul, M. & M.): We use both, but prefer the angle bar, which we have been using about four years. We lay it with a suspended joint. We use no nut locks on our road. I have never used any.

Mr. Preston: Do you have any trouble in keeping your bolts tight?

Mr. Mayer: Yes, more or less. We tighten them about twice a year — in the spring and fall. It costs considerable money to do it.

The President: Do you use a hexagon nut?

Mr. Mayer: We use octagon on angle bars, and square on fish plates. I think the octagon is the best for angle bars.

The President: Can you get a joint up perfectly tight without a nut lock?

Mr. Mayer: We cannot get the joint up very well the first time. After tightening twice or three times they stay better.

The President: Mr. Collom, do you use angle bars and fish plates?

Mr. Collom: No, sir. We use a straight bar. Never have used any angle bars. We use a Sampson bar mostly. It has an oval head, or what we call a "T" head, and a slot hole. We use a square nut, and use no nut locks.

Mr. Preston: Do you have any trouble in keeping your bolts tight?

Mr. Collom: Considerable. I have recommended nut locks, but have been unable to get them.

Mr. Stafford (Central Ohio): We use both the angle bar and the flat splice. I prefer the angle, bar on account of its greater strength.

The President: Do you lay them with a suspended joint?

Mr. Stafford: We have no suspended joints. Our angle bars are punched in the center, or nearly so.

Mr. Crippen: What length are they?

Mr. Stafford: About twenty inches. We use four bolts.

The President: Do you find any trouble with the angle bars breaking in the center?

Mr. Stafford: Yes, a little; not very much. If the joints are allowed to get loose they are liable to break.

Mr. Preston: Do you think they will break as quick or quicker than the plain fish plate?

Mr. Stafford: I think they will break sooner.

The President: You say you prefer to use them on account of their strength. If they will break sooner than a fish plate the fish plate ought to be the stronger.

Mr. Stafford: Under the same circumstances. If you could get the same iron into the straight or flat splice, I think for a single tie joint I would prefer it on account of that liability of breaking. I don't think that you get the proper strength out of an angle bar where it is slotted in the center. I think that is detrimental to it.

The President: What nut lock do you use?

Mr. Stafford: I have used the fiber, but only a little, only an experiment; more of the Verona. The fiber washer was on the track when I took hold of it. How long it had been on I don't know. From the experience I have had I prefer the Verona. Never have used any Pratt washers.

Mr. Preston: What kind of nut do you use?

Mr. Stafford: Both hexagon and square; and if you use a Verona washer, as far as holding it is concerned I have no preference.

The President: Do you have any difficulty in your wrenches slipping when you are tightening nuts?

Mr. Stafford: Yes; but not much, provided you use a steel wrench. I think a steel wrench is *the* wrench in any event.

The President: In laying your track, and using the Verona nut lock, which side of the nut would you put in? The round or the flat?

Mr. Stafford: I do not think it makes any difference, except as to the appearance. I think it looks better with the round side outward.

The President: Mr. McQuiston, we should like to hear from you on this subject.

[illegible] We have been using the common fish plate until about a year ago. We laid twenty miles of heavy steel, [illegible] and used the angle splice. We put a tie under it, the same as we would with a common plate. We laid it in a region where we have a fall of [illegible] feet in some eleven or twelve miles. [illegible] that it would [illegible] the shade [illegible] Of course [illegible] the easiest, and then it can't [illegible] Merely [illegible] just walk the [illegible] angling. One side [illegible] get anything [illegible] we don't have that [illegible] angle splice anywhere else.

[illegible] under the tie?

[illegible] angle plate in [illegible] suspended joint. [illegible] I have [illegible] than I [illegible]

[illegible]

[illegible] used a few [illegible] them. We [illegible] use [illegible] the [illegible] in use [illegible] but [illegible] the same but [illegible]

[illegible] their mas-[illegible]

[illegible] the pur-[illegible]

[illegible]

[illegible]

[illegible]

[illegible] between [illegible]

[illegible]

could not do without putting on a washer, or something like that.

THE PRESIDENT: Which side of the nut do you put next to your washer?

MR. MCQUISTON: The flat side.

THE PRESIDENT: Mr. Downing, what kind of joints do you use?

MR. DOWNING: I think we have only two, the angle bar and common fish plate.

THE PRESIDENT: Which gives you the best satisfaction?

MR. DOWNING: Well, as far as the angle bar goes, I have not had much experience with them. They did not adopt them on the division I was on until last fall, but from what I have seen of them, I prefer them to the others. I have never used any fibers. We use the Pratt and Verona.

MR. PRESTON: Which would you prefer?

MR. DOWNING: I think the Verona is the best, for this reason: When you relay your track and take them off, the most of them are in good condition to use again, while with the Pratt, a great percentage are destroyed,— bursted.

MR. PRESTON: What causes the bursting or destroying of the Pratt washer in taking them off?

MR. DOWNING: Tightening up the bolt. You can't tighten up the bolt on a Pratt washer only to a certain extent without bursting it open.

THE PRESIDENT: In taking them off, isn't it the trouble that the rubber squeezes into the threads of the bolt and tears the rubber right out?

MR. DOWNING: Yes; they are hard to get off.

THE PRESIDENT: Have you used any of these reinforced fish plates?

MR. DOWNING: Yes; they have some of them on our track. They have been in use since 1878–9.

THE PRESIDENT: Did you ever find one of them broken in the center?

MR. DOWNING: I do not remember to have seen any of them broken, but I have noticed lots of them bent. I had an idea that the cause of those bending was perhaps because they were not made quite so good as the others.

The Secretary read the following communication:

D. WRIGHT, Red Wing.

The Roadmasters can have what room they want at the capitol, and when they want it, call on the Secretary of State.

S. P. JENNISON,
Secretary of State.

MR. MOTT: I would like to make a motion, Mr. President, that Mr. Preston be invited to deliver a lecture before the Association this evening.

Motion carried.

The President stated that there had been some discussion among the members in regard to the organization of a mutual benefit association, of a similar nature to those already in existence among the conductors, engineers, etc., and thought it would be well if members would think the matter over.

After some discussion, on motion of Mr. McQuiston, the matter was laid over until the September meeting, 1884.

The Association here adjourned until 7:30 o'clock.

EVENING SESSION.

FOOT GUARDS.

THE PRESIDENT: Gentlemen, as our orator has not yet arrived, perhaps it would be well to take up the question of life-saving appliances. Mr. Tierney, what have you used as a foot guard?

MR. TIERNEY stated that he used the Hart guard, and produced a diagram, which he explained to the members.

MR. MOTT: You consider that perfectly safe?

MR. TIERNEY: There is no possible chance for a man to get his foot in and get caught. He cannot get caught. Both our yards in Chicago are entirely covered with them, and they are, in my opinion, the best foot guard in existence to-day, and are so pronounced by every one who has seen them.

THE PRESIDENT: On my division, the Chicago yards have been completely covered; every switch and frog, guard rail and spot that where a man is liable to get his foot, has these foot guards. So has Rock Island and Peoria. We are now working in the smaller yards along the main line; I think a man went to La Salle yesterday; and I find that the average cost to us is about three dollars a switch, complete. Now, in a switch complete, we will take a stub switch for instance, you have two pieces; that is, one on each side of the two rails that go into the head block. (The President here described the working of the guard to the Association from the diagram.)

Mr. Moll: The North-Western folks have what they call a "boss frog," that is cast between the rails; also, a piece of casting sets in — it is beveled the same way this is, similar to the Elliott frog, and it is utterly impossible for a person to get his foot in the frog. It sets on a plate.

The President: I will ask Mr. Preston, who has put in a quantity of these guards, what they have cost him per switch complete; a stub switch.

Mr. Preston: I can give you the actual cost for labor for a split switch. The actual cost for labor alone is $1.30; to be included in that is sixteen feet of oak lumber, besides about twenty-four ⅜ carriage bolts. For a stub switch, the cost for labor alone is about $1.02. Of course we could figure it out; figure the lumber at $20.00 per thousand, if you please, and the bolts would be worth about seven cents,— they can be bought for that. For a three-way stub switch complete, frogs and all, that includes the blocking at the head block, would be $2.64.

The President: Those that we have put on have averaged us a trifle less than $3.00 a switch complete, lumber and all. I have no doubt it has cost me more than it has Mr. Preston, from the fact that we have put them into the yards where there was continual switching, which of course adds to the cost. Take them out on the main line they would not cost so much. You can use strips, anything that is 2½ inches wide, which just makes the guard.

Mr. Moll: What is the royalty on them?

The President: I don't know, only from hearsay; he wants a dollar a mile, but I understand that he takes what he can get.

Mr. Preston: If you get a gang of men once broken into using that blocking, handling the drills, they will do it much cheaper.

The President: It is the finest drill that I ever saw work; it turns with a crank, and you can drill a three-eighths-inch hole through a steel rail about as quick as I tell it.

Mr. Preston: We have drilled them lots of times in forty seconds.

Mr. Moll: What drill is that?

Mr. Preston: The drill that Mr. Hart sends with the guard.

A member stated that the cost for labor to them was $1.65 a switch, taking them altogether, and that it was a complete foot guard; that it was impossible for a man to get his foot into it.

The President: Mr. Moll, what foot guard do you use?

Mr. Moll: We use a three-inch block, simply sawed the proper shape, and put in at the heel of the frog; notches cut out for the nut, and the same at guard rails and at the head block.

Mr. Preston: Have you any idea what they cost you apiece to fit a frog up with them complete, switch and all?

Mr. Moll: No, sir; we have never kept any account of it; simply sent them and had the section men put them in; the cost is very little. A section man, while he is around repairing a frog, can put the whole business in, in ten minutes; they are spiked on to the tie.

The President: Do you consider them safe?

Mr. Moll: Well, I consider them very good, better than nothing; I don't know as they are absolutely safe. The only place where it would be unsafe is at the point of the frog, right at the throat.

Mr. McQuiston: How long does that blocking last?

Mr. Moll: Well, it usually lasts as long as the frog itself will. When you take out the frog you are apt to split your plank in pulling it out. There is no wheel touches it, or anything.

The President: Aren't there times when the wheel strikes it?

Mr. Moll: No, sir; and if it did, the material being of pine, it would cut right through.

Mr. Preston: You use pine?

Mr. Moll: Yes.

The President: Did you ever try putting your foot on the block and shoving it along, and seeing if it would not fasten between the balls of the rails so that your foot would catch and hold you?

Mr. Moll: I have tried my foot in it; I could not get mine into it; they are pretty good-sized feet, though; I don't wear any small heels. You could use these blocks (the Hart), and have them put on in the shop.

The President: Yes, we do that at the shop, but the frogs we have already in, of course, we have to fill; but what new frogs go out, we put the guards on them before they go out.

Mr. Moll: Is this a recent order of your company?

The President: Yes; we commenced putting these on, I think, in May when our company bought the right.

Mr. Moll: Does the state force you to do it in Illinois?

The President: Yes; it is a state law; we are obliged to use something, and this is the best that we know of, or the best that we could find. Our management looked upon it in this way: that should an accident occur, and we used a block such as you speak of, the authorities would say, "Here is a thing that is absolutely safe, and why didn't you use it?" Consequently they bought the right; what they paid for it I don't know.

Mr. Hayward: I have been using wooden blocks, such as Mr. Moll speaks of, for the last nine years. This year, the cost was about $60.00 for repairs; we send a man to repair them every spring. The blocks are all cut in the shop. The first cost of blocking a switch entire with these blocks, I think, was a few cents less than a dollar a switch, that is, a single one, and the blocking has all come out of the little scraps and ends. We spike our blocks right in the throat of the frog, just the same as we do the end of the wing, and a man in about thirty days will go all over the road and examine them all very carefully, and each section foreman is provided with blocks to keep on hand in case one should be split at any time.

The President: Did you ever have an accident occur?

Mr. Hayward: Never have had an accident in the nine years we have used them. We commenced in 1874, and have never had a man caught since then. What it has cost would not pay for one man's life.

Mr. J. H. Preston then read the following address:

Gentlemen of the Convention,—Years spent on the road bed are not conducive to facility of speech. Most of us can cut and file there, better than in the use of our English.

Washouts and slides are not the nurses of a very smooth oratory. Urgent managers, impatient passengers, eager merchants, waiting for repairs in roadway are not conducive to the art of smooth speaking, however much they may use plain talk somewhat emphasized. The construction men, who are our most frequent orators, do not require a special brilliancy. And so, with such a training, you cannot expect from me aught but the thought of experience expressed in the plain, blunt words that belong naturally to our calling.

And when we come to our vocation as a field of thought, study and re-

[illegible] No man of judgment, [illegible] of heart or honesty or fidelity, [illegible] the responsibilities of [illegible] service, without feeling [illegible] thought and study.

The railway is the [illegible] highway of modern commerce. The tonnage of the world [illegible] are confided to its carriages. [illegible] presidents of republics, with the [illegible] trust their lives to its mighty power, while the management of this great factor in the world's progress must [illegible] responsibility of this burden thus confided to its keeping.

[illegible] is the integrity of the [illegible]

[illegible] proud of. The roadway [illegible] what the fields of the farmers are to the country—the [illegible] and the roadmaster and his force are to the roadway what the [illegible] fruitful acres.

What the [illegible] the wall is to the house, [illegible] the railway. As it shall be honestly built and honestly maintained [illegible] anticipation and comprehension of the [illegible] the changes of currents, the effect of settlement [illegible] safely the mighty wares of commerce [illegible] pass over it.

No [illegible] The strap iron must needs vanish [illegible] yield to the fish [illegible] competition of the busy present [illegible]

[illegible] more than mere in[illegible] that reach into [illegible] the region of earnings and [illegible] waste.

The [illegible] the bank ac[illegible] pounding wheels [illegible]

[illegible] can present equals [illegible] be safe.

[illegible] American railways rests largely [illegible] gentlemen have the [illegible]

[illegible] below none other in [illegible] And still I believe [illegible] by ourselves or the [illegible]

[illegible] Railway companies [illegible] are combining, coöperating [illegible] mutual profit, strength and [illegible]

[illegible] thus afforded. The

operating department have for years reaped the profits thus afforded. Public conventions have kept our worthy technical and theoretical friends, the civil engineers; our ever careful and cautious friends, the car builders; our practical friends, the master mechanics; our watchful and vigilant compatriots, the locomotive engineers; our gallant friends, the conductors; our careful brethren, the baggage-smashers, all in eye, until it seems to have been forgotten that there is a department that is the very foundation and inception of the whole system, in the careful and efficient management of which rests the safety of all these employes, the profit of their employers, and the comfort of the public.

This is not as it should be. It is high time it were otherwise. It rests with ourselves, gentlemen, to make it so.

The roadway department of the most insignificant railway surpasses in actual practical importance all departments of its own or any other road, and in so much as it does, does our position exceed in responsibility and consequent importance that of any other in the line of railway service.

Executive management can never foist upon a critical public a poor, unsafe road bed.

Financial officials cannot make of permanent worth the stock of a railroad corporation whose grades are poorly constructed and crumble beneath the contact of the elements, or whose bridges go down before the rush of torrents, ignorantly unanticipated or unprovided for.

Honest capital seeks the railroad that has an honest road bed.

Gilded coaches, epicurean dining cars and luxurious sleepers will not attract travel long to the rough or doubtful road bed.

Capital, travel and commerce are critical in these respects, and brook no inefficiency here.

And so we live, the supporters and sustainers of a superstructure that stands or falls, as our work is done honestly or ill. Done honestly means years of preparation in the most practical of all fields — actual work — the critical test of every excellency. It means the judicious study of the action of the greatest force, steam, united with speed and ponderous weights; the experimental test of wind and wave upon earth, stone and iron; the economical use of men and means; the anxious thought that comes to every honest mind as it contemplates the chances of error or oversight; the weary hours that follow in the wake of washouts, wrecks and slides; the strain upon mind and body that comes with all this labor and anxiety.

What is the result as demonstrated on the blackboard of time? Why, that the road service has kept even pace, at least, in the march of all improvements.

The late Exposition of Railway Appliances, held at Chicago, placed the beginning side by side with the present, in such manner as plainly showed what had been done.

If the rich and elegant coach standing near the early cars excited wonder and admiration for the evidence of progress their contrast disclosed, so did the burnished steel rail, bearing undinted the hammering of a thousand trains, lying beside the rusty, battered scrap iron of the early roads.

If the comparison between the "Arabia" and the modern engines called forth encomiums of praise, so did the comparison between the ancient and modern provisions for road construction.

Having thus briefly adverted to the relations of our department to that of other departments of railroad work, it naturally occurs to consider the purposes of this Association. They are readily seen to be as broad as the importance of our duties, and as suggested by one of the best railroad papers in America (the *Railway Age*), "the responsibilities committed to roadmasters are certainly as important as any connected with railway service."

And if, as said before, the profit of the employer and the comfort of the public rests fundamentally upon the integrity of our labor, it follows, as a necessary consequence, that the object of our coming together should be practical, comprehensive, and thoroughly useful.

A purpose of mutual benefit can only be fully served as it shall comprehend as well the thoughtful consideration of how best to perform, to our several employers, the duties of our station, as our own immediate betterment and advantage. For the latter can only be based or demanded upon merit, and these can come alone upon the best, the most conscientious, the most thorough work.

The right to personal advancement, promotion, increased compensation, can no more be founded upon careless, unintelligent work than successful railroading can be done upon a poor road bed.

One and the first purpose, then, of this Convention of Roadmasters is to erect and maintain, through concert of action, comparison and interchange of ideas, generous and spirited rivalry of thought and effort, a high and practical standard for our department.

This standard shall represent at once strength, economy, safety, vigilance, discipline, harmony and general utility.

This means intelligent and attentive consideration of the several problems presented from time to time for our solution; firm, but courteous enforcements of our judgments, when once they are formed; vigilant watchfulness, as well for all improvements in ways and means, as for the encroachment of time and decay; quick and generous recognition of every aid that experience and intelligence of others shall have demonstrated to be desirable; careful and prudent use of means as well as of men; garnering for mutual interchange the fruits of our annual experience; in a word, with every intelligence on the alert, striving to make that which, to my mind, is stupendous art, a perfect road bed that shall at once, by its economy and strength, satisfy the company, by its smoothness and safety command the confidence and admiration of the public, and by the manner in which it was managed, leave no sting of oppression in the thoughts and memories of those whose brawn and muscle gave it form and symmetry.

This involves infinite detail as well as grand aggregates. It includes alike the spike and the towering embankment, as well the foot guard for the unwary, or more often busy and engrossed brakeman, as the spanning bridge for the thundering train, as well the pennies to be saved at every turn, as the dollars on the occasional contract, as well the fiber and tension of the tie as the strength and integrity of the mighty beam, alike the possibilities for mischief of the tiny brooklet and the majestic river.

It means to know the seasons and their influence, not as the farmer knows them, but as years shall have shown their influence upon iron and earth, upon rock and stream, upon cut and fill, and the consequent integrity of each, and its ability still to bear with safety the burdens to it belonging.

It means to know promptly and to intelligently measure the alleged improvements that active brains are constantly presenting for the consideration of railroad men.

It means to have a track and a roadbed that shall combine safety for all who use it, free from pitfalls and traps for the employe on foot, strong for the engine and its driver, absolute freedom from danger to the traveler and his property, as nearly as this can be reached.

This is the great duty. To aid each in its best performance is one of the objects of this Association. To do this we bring here and compare our several experiences. Here each member makes, or should make, his year's work (in so far as it is new, or developed new problems or new results) an open book for the inspection and instruction of the others.

Has wood or earth or stone or iron shown unexpected weakness or unusual strength and endurance, it is a page of instruction that should be opened for the common benefit of all.

Has a wearing rail, a treacherous bank, a fitful stream made weeks of labor and nights of unrest, without one being able to espy the reason, the facts and circumstances belong to this place of common study.

Has individual study and experiment haply found an easier or better way to surmount a frequent difficulty, here it should be brought as a common benefit.

It is as true here as anywhere that "in a multitude of counsel there is wisdom." This wisdom thus acquired we use first for the benefit of the business of our choice.

Our effort in this direction is fortunate and auspicious in its commencement. We are really only at the beginning of this effort to improve ourselves, our work and our condition by this union of action and comparison of ideas, and as we come to the plane of action in this movement to unify our heretofore scattered energies, to give character and form to a great, but heretofore formless branch of railroad work, to dignify the labor department of the modern highway, we find the whole intelligent world rousing up to the thought of dignifying, ennobling, intellectualizing labor.

Society has discovered that the hand, the eye, the arm was being neglected. That the brain was being carried out of the useful domains of the practical into the useless realms of the abstract.

That scholars are being made at the expense of business men. That the professions were being crowded at the expense of thinning the trades. That trained intelligence was disappearing from the ranks of labor and mechanics, and giving place to a sort of stolid physical quality that had neither intelligence to do well its work nor capably attempt the betterment of its own condition.

The result was inevitable. Such labor, undirected by its own intelligence, became first careless, inert, unambitious, and then, no longer having the right, because incompetent, to command respect and demand the recognition that goes with respect, fair compensation, it became the prey and football of scheming, crafty, unconscionable capital. What has followed?

The so-called "strike," the natural, but nevertheless impractical revolt from conditions thus produced, wasting millions of money, destroying mints of property, losing months of industry, stopping the hand of the mechanic, laying its paralyzing touch on the whirring wheels of factories; stopping the avenues and highways of commerce and saying to the very lightning it should cease to be the servant of man. What is the remedy? Better compensation. But how shall it be attained? By saying to others who would work, You shall not? The strike answers in the affirmative, and thus is presented a problem that has at last awakened earnest, anxious, practical thought, with the effect to lift the standard of labor and with it the plane of the laborer, to mix brain with muscle, to make all capable of work, to wipe out the distinction between labor and capital, to make the laborer self-respectful and respected, to lead capital to know and appreciate labor from the standpoint of experience, to make the boys of to-day know a spade from having made and used it, a steel rail from having aided in its forging, a road bed from actual contact with its creation.

The beneficent aim to thus leaven the lump of labor with intelligence is happily cotemporaneous with our movement to formulate and systematize the road department.

It belongs to the domain of labor, muscle, endurance, fortitude, main strength. These, guided by a controlling, directing intelligence, build railways, erect bridges and pierce mountains.

We belong, it is true, to the work of guiding this expenditure of force. But we come, and our successors will come to be guides, by first having been guided. Now we propose to give direction to our efforts, to dignify what has heretofore, like labor, been without dignity, because wanting in unity, wanting in the application of intelligent thought to the duties of the position; wanting, in fact, in personal appreciation of the idea that this road work is something more than a mere muscular putting together of piles of dirt, sticks of timber and lines of iron.

We have reached the point where this work means, as it should and must if we would improve our own conditions, something more than these things.

It has in it a sentiment, a thought, a worth, a value above and beyond the mere corporeal or material elements that enter into construction.

It appeals to more than the gross materialism of our natures. It signifies power, strength, durability, perfection of purpose. Viewed thus, it is ennobled, and being ennobled it ennobles us. This cannot be without one advantage following, and thus we reach one personal gain.

It is true individual effort ordinarily has for its ultimate object individual gain. This is not only natural, but praiseworthy, and is recognized by every code of morals, every shade of politics and every grade of society. A fair day's wages for a fair day's work is the theory of those who legislate, and should be the practice of those who employ.

I have endeavored to indicate the proper standard for a fair day's work, especially in our department, namely: energetic, vigilant, conscientious and intelligent service. I should be untrue to you, to myself and indeed likewise to the employers whose interests we represent, if I neglected to note the bearing that this properly has upon the subject of wages.

From every standpoint, whether of justice or economy, these should be fairly and fully equal to the importance and the integrity of the service. Here, if ever, merit should count. Fair dealing demands it, and true economy and good management recommend it.

The man who by years of attentive industry on the road bed has acquired the knowledge, the experience that fits him for practical and efficient work, is entitled, when the scales of compensation are set up, to have his experience and practical ability weigh heavier than the untaught service of the impractical man.

Railroading is intensely practical. It deals coldly and without passion with profit and loss. Facts and not fiction are controlling the debit and credit sides of the ledger. It knows no poetry nor sentiment. They deal alone with figures, and these only look pleasant and alluring, when the balance stands on the right side.

Why should not this intensely practical judgment continue in the employment and compensation of men?

This judgment will not for one moment allow that iron of untried manufacture shall command a higher price than that long known to be true and reliable. Nor are dollars squandered on "gew-gaws." In machinery and material it is the strong, the substantial, the useful, the tested thing that passes muster, and commands its price. Why not with men? Which can do the most and best work in the least time and with the least means? The answer to this should be the touchstone that opens or shuts the door to preferred place, and the purse to liberal payment.

A thoroughly practical and competent roadmaster is less expensive at a salary of $3,000 or $4,000 per year than the incompetent one at $1,500.

"Penny wise and pound foolish" is truer in the great operations of railroading than in the petty plans of Franklin's generation. Money saved (by dwarfing the energies and abilities of the practical men on a railroad) through poor salaries to be spent on dress parade, better in my opinion be saved on dress parade to be expended in encouraging the practical men.

We have and are as much entitled to have aspirations and desires for social and financial advancement for ourselves and those dependent on us, as any, and these are to be met, if at all, with the money that comes as the fair reward of our expended energy and ability.

Let us see to it that what we desire we get. Not understand we through factious schemes or undisciplined or insubordinate demands, but through the logic of that reason which demonstrates that the cheapest is not the best, but that the best is the cheapest; and through that motive of fairness that dwells in every man, when it can be reached and which leads him to recognize, appreciate and fittingly reward meritorious efforts whenever and wherever found.

Thanking you, gentlemen, for your kind attention, in conclusion allow me to express my heartfelt wish for each and all of you, that when retiring from the service you may find the retirement to which you go pleasant and satisfactory. "May your track on the down grade be well ballasted; your journey to the last station a long one, without accident; your paymaster always in funds, and when signaled in to the end of the line, may you land on the right platform, be ushered through the proper gate, and find rest in the desired depot of your most sanguine hopes."

MR. MCQUISTON: I move a vote of thanks to Brother Preston for the very interesting address he has delivered. Motion carried.

MR. SWINNEY: In addition to that I would make a motion that the address be published with our proceedings. Carried.

The following was then adopted:

Resolved, That we, the members of the Roadmasters' Association of America, in convention assembled at St. Paul, Minn., through the courtesy of Mr. J. B. Moll, roadmaster of the Chicago, Milwaukee & St. Paul, having visited a cut on the H. & D. Division of that road, and examined the practical working of the American Railway Ditching Machine, we believe it to be an entire success, and entirely capable of performing the work for which it is recommended, and the best device for ditching wet cuts we have ever seen.

THE PRESIDENT: Are there any committees ready to report?

MR. SWINNEY: The Committee on Drainage is ready to report. We have agreed on the following report:

ST. PAUL, September 13, 1883.

To the President and Members of the Roadmasters' Association of America:

GENTLEMEN,—Your Committee on Drainage beg leave to report as follows for stone and gravel ballast: That the ditch should be at least seven feet, and not to exceed twelve feet from the rail, and at least two feet below the bottom of the tie, the slope to commence three inches above the bottom of the tie, and not to exceed two inches per foot. For mud track the slope to commence from the bottom of the ties.

J. SLOAN, *C. & E. I. R. R.*
P. J. KELLEY, *C., I., St. L. & C. R. R.*
S. L. SWINNEY, *M., St. L. & P. R. R.*

Adopted.

FRIDAY, September 17.

The Association accepted the use of a special train on the St. P., M. & M. R. R., and visited Lake Minnetonka and the stone arch bridge of the Manitoba road, at Minneapolis, and returned to St. Paul at one P.M.

AFTERNOON SESSION.

THE PRESIDENT: Before we proceed to any business I wish to state that the management of the Manitoba road has tendered the Association an invitation to take a special train from its Union depot to-morrow morning, and go to Fargo, remain there over night, and return here by their other route. It seems they have two lines between here and Fargo. We should reach here on Sunday morning in time for the trains east leaving the city Sunday afternoon and evening. There ought not to be less than twenty or twenty-five, if we go at all. So far as I am concerned I would like very much to make the trip, although it seems like accepting a good deal of the Manitoba folks after all the courtesies they have shown us.

MR. MCQUISTON: As far as I am concerned, I would go on the cars or do anything to remain in such pleasant company. In all my intercourse with men I have never found so genial and hearty a welcome as I have found here. It has been a great pleasure to meet with you, gentlemen, and I hope every one of you will be at our next meeting, wherever it may be. I, for one, hope that we may be able to take this excursion.

Sixteen members announced that they would make the trip.

THE PRESIDENT: At a meeting of the Finance Committee, night before last, we found that we have not funds enough in the hands of the treasurer to pay our present expenses. We have enough to pay all our indebtedness now, but we have the stenographer to pay, and the printing of the books that were voted to be published, and that will cost us not far from $100. In view of this fact, the Committee levied an assessment of $1 each on the members of the Association, which can be paid now into the hands of the Secretary. The representative of the Vulcanized Fiber Washer Company hands me $5, and asks the Association to accept it and send him a copy of the book containing our proceedings. What shall we do with it?

MR. SWINNEY: I move, Mr. President, that the money be accepted and the book furnished him when published.

Motion carried.

THE PRESIDENT: There are two or three questions which were to have been discussed at this meeting, but the time seems to have been occupied very fully, and we have not reached them. We have worked hard every afternoon and evening, and in the forenoons we have been kept very busy by our friends here. I think some disposition should be made of these questions.

MR. MOLL: I move that the questions that have not been discussed be laid on the table as unfinished business, and carried over until our next regular meeting.

Carried.

THE PRESIDENT: Gentlemen, the election of officers for the ensuing year will be next in order.

MR. PRESTON: I move that the present officers hold over until our next annual meeting.

MR. SWINNEY: That cannot be done. It is necessary to elect them annually.

THE PRESIDENT: Our constitution says that the officers shall be elected annually by ballot.

MR. McQUISTON: I nominate the officers who at present are acting as officers for the ensuing year.

THE PRESIDENT: I think you will get through with this much quicker to take them up in their regular order.

MR. MOLL: I nominate I. Burnett for president.

MR. SWINNEY: I move that the Secretary be instructed to cast one vote as the sense of the Association for I. Burnett for president for the ensuing year.

Carried.

Messrs. John Brennan, of the St. Paul, Minneapolis & Manitoba; Joseph Hayward, of the Kansas City, St. J. & Council Bluffs, and J. B. Moll, of the Chicago, Milwaukee & St. Paul, were nominated for first vice-president.

Mr. Brennan was declared elected.

MR. BRENNAN: I thank the members of the Association for the high honor they have conferred upon me, and while I am sure that there are older and more experienced men, who would have performed the duties of the position in a much more acceptable manner than I can hope to, yet I shall endeavor to do what I can to further the interests of the Association.

THE PRESIDENT: The next nomination will be for 2d vice-president.

Messrs. David Wright and James Sloan were placed in nomination, and Mr. Sloan declared elected.

THE PRESIDENT: The next nomination in order is that of secretary.

MR. TIERNEY: I decline to serve as secretary for another year.

MR. PRESTON: I nominate, Mr. C. R. Meeker of the C., B. & Q.

MR. MOLL: As no other name is mentioned, I move that the Secretary be instructed to cast one vote for Mr. Meeker for secretary for the ensuing year. Carried.

THE PRESIDENT: Gentlemen, in Chicago we elected as one of the Executive Committee, a Mr. J. C. Evans. There is no such man on the records of the Association, and we have not been able to find any one who knows him.

MR. MOLL: I was introduced to a roadmaster at that meeting, by the name of Evans.

MR. COX: So was I. It seems to me, he told me he was a roadmaster on the Wisconsin Central.

MR. PRESTON: I think Mr. Evans came to Chicago with Mr. Brunk, from the Wisconsin Central.

MR. KELLEY: I nominate Mr. S. L. Swinney as a member of the Executive Committee for the three years' term.

The Secretary was instructed to cast one vote for Mr. Swinney, and he was declared elected.

MR. MCQUISTON: I nominate Mr. Adamson for treasurer.

The Secretary was instructed to cast one vote for Mr. Adamson, and he was declared elected.

THE PRESIDENT: I believe, gentlemen, that that closes the election of officers, and for myself I will say this, that I am thankful to you for conferring the honor of the presidency upon me for a second term. There is considerable work connected with the presidency of this Association, and I hope I may be able to perform the duties of the office in a manner satisfactory to you all. Such at least will be my endeavor, and if I fail, it will be an error of the head, not of the heart. I think if every member will show the interest he has manifested at this meeting that we shall have no difficulty in securing a membership of at least two hundred by our next annual meeting. It is the duty of every member to do what he can to increase our membership and build up the Association. These large corporations, some of them, have twelve or fifteen roadmasters upon their road, and if the members of this Association will try and induce the roadmasters on their respective roads to join us, they can do more toward securing a large membership than all the presidents and secretaries you could elect. Try and control the men upon your own roads and other roads that start or terminate in the town where you reside. There is hardly a roadmaster who does not know some others, and if he can induce them to join us, the Association will grow very rapidly. It will be in order now to select a place for holding our next meeting.

Mr. Moll: I move that we hold our next meeting at Indianapolis.

Mr. McQuiston: Gentlemen, I have on several occasions made a few remarks, and I have done it to draw the other members out. I do not profess to know much about organizations of this kind, but I am very desirous that it should prosper, and I wish, if possible, to get the other members to do a little more talking. I know there is ability enough in this Association to say almost anything that would be desirable to have said if we could only get the members started. I am a little inclined to talk a good deal, but, as I have said, my principal object was to draw out the rest. I have said something on almost every subject that has come before the Association, and I now desire to say a word in regard to holding our next annual meeting at Indianapolis. There are quite a number of railroads centering there, and it is but a short trip to Louisville, and only 111 miles to Cincinnati, and I think large accessions to our membership can be made by holding the meeting there. It is a God-send to us to get out among such a jolly good set of fellows as we have found here in this country, and I would be glad to come here to St. Paul or go to San Francisco for our next meeting. It is a very pleasant thing for us to go away from home and meet our friends, and I have no desire to locate our next meeting at any particular point, except for the purpose of adding to our membership. I hope you will vote in favor of Indianapolis.

The President: Gentlemen, if there is no other city mentioned, we might as well make a motion and make it unanimous.

Here is a communication I received this morning from Mr. Charles Latimer, chief engineer of the New York, Pennsylvania and Ohio Railroad:

I. Burnett, President Roadmasters' Association:

Dear Sir,—I regret that I was unable to be present at your St. Paul meeting. I gave all my roadmasters permission to go, but they thought they would not attend until the next meeting. They will all be present then.

Hoping for the success of the convention, I am

Yours truly,
Charles Latimer,
Chief Engineer N. Y., P. & O. R. R., Cleveland, Ohio.

Mr. Moll: Mr. President, as there is no other city mentioned as a place for holding our next meeting, I move that when the Association adjourns in St. Paul, we adjourn to meet in Indianapolis one year from the second Wednesday in September. Carried unanimously.

Mr. Moll: I move that Mr. McQuiston, Mr. Kelley and Mr. Moore be appointed a committee to make arrangements for our meeting there — hotel accommodations, place of meeting, etc. Carried.

The President: I would say to that committee that they should have their arrangements made, and the secretary should be fully advised in regard to all the details of them, at least thirty days before the time of meeting. Sixty days will be better, in order to give him time to get his circulars printed and sent out.

As the certificates of membership are not filled out, and as we shall be obliged to mail a large proportion of them anyway, I think it would be as well perhaps that we take them home and fill them out and send them to the members.

Mr. Swinney: I make a motion that the President and Secretary be allowed to take the certificates home with them, fill them out and send them to the members. Carried.

One of the members inquired if, in case a roadmaster left his occupation, or was discharged, that would disqualify him from being a member of the Association.

The President: I understand not. It has occurred to me that in an Association of this kind, where men become acquainted with one another, know each other's experience and ability, that if from any cause a member should leave his position, and require another, that whatever we might do in his behalf we ought to do.

Mr. Preston offered the following resolution:

esolved, That we extend to the Governor and Secretary of State of the of Minnesota our thanks for their courtesy in tendering to us the state se for holding our meetings; to Mr. Bronson, superintendent of Union ot, for a like courtesy, and to the officers of the St. Paul, Minneapolis Manitoba Railroad Company, and the Chicago, Milwaukee & St. Paul ilroad Company for the kindnesses extended to the members of this ganization.

That a copy of this resolution be mailed by the Secretary of this organization to the Governor and Secretary of State of the state of Minnesota; to Mr. Bronson; Mr. C. H. Prior, superintendent of Chicago, Milwaukee & St. Paul railroad; E. B. Wakeman, general superintendent of St. Paul, Minneapolis & Manitoba railroad, and to Messrs. J. B. Moll, David Wright and J. A. Mayer.

Adopted.

MR. MOLL: Mr. President, I would like to hear the questions read that come up for discussion at the next annual meeting.

THE PRESIDENT: Frogs and Switches. Creeping of Rails; Cause and Prevention. Life-saving Appliances;—that was partially discussed last night. Surfacing; Manner of Filling Track, with the Different Kinds of Material Used for Ballast. Elevation of Curves. Those are the undiscussed questions. It occurs to me that a few more questions might be added, and that it would be well to have a committee appointed to prepare something of the kind.

The Committee on Life-saving Appliances made the following report:

Your committee, to whom was referred the subject of life-saving appliances, beg leave to report that we believe the Hart blocking is the most complete foot guard now in use.

J. E. COX.
GEORGE W. DOWNING.
THOMAS ADAMSON.

On motion of Mr. Preston, the report was adopted, and the Committee discharged.

The Committee on Nut Locks and Joints submitted the following report:

Your committee, to whom was referred the question of nut locks and joints, respectfully report that we recommend the angle bar, but recommend that it be 34 inches long, and that a tie be used under the joint, so that the angle bar will reach a tie each side.

In regard to nut locks, we would place the Verona first, and Pratt second, but recommend the trial of the vulcanized fiber, as one of your committee has used it for some years, and prefers it to any other.

S. L. SWINNEY.
J. SLOAN.
THOS. ADAMSON.

The report was accepted and adopted, and the Committee discharged.

Mr. Marsh: Mr. President, I was not here when the discussion was had in relation to foot guards, and I will say that I have used for three years a plain block of wood in all of my guard rails, frogs, and at the head block, and we have never had a person hurt since we adopted it. We have also bought the right for the Hart guard, and are using it, but we do not consider it as safe as wooden blocks. Of course, it looks better.

The President: Which is the most expensive?

Mr. Marsh: We have not used the Hart guard long enough to be able to tell. The only objection to the blocks is that they have to be replaced pretty often; they get split in moving your rails and have to be renewed, and it is a question which is the cheaper of the two. I should say though, that the blocks were.

Mr. Swinney: There was a matter came up for discussion among a few of us the other evening in regard to paying our Secretary something. He has a large amount of work to do, and I think he should be compensated.

The President: At our meeting at Niagara Falls we voted the Secretary $40, and he presented it to the Association. At Chicago, we voted the Secretary $50, and he accepted it. At Cincinnati, the Secretary was voted $50, and he presented it to the Association. I think if you vote him anything it should not be less than $50.

Mr. Gallinau: I move that we allow our Secretary $50.

Mr. Sloan: I second the motion.

Mr. Tierney: I decline to receive any money, gentlemen, for the small service I have rendered. I only regret that it was not in my power to do more for the Association. I return you my thanks for your kindness in making the offer of compensation.

Mr. Preston: I move that a vote of thanks be tendered to Mr. Tierney for his services as Secretary during the past year.

Carried unanimously.

Mr. Swinney: I move that a vote of thanks be tendered to our President for the able manner in which he has presided over our meetings.

Carried unanimously.

On motion of Mr. Kelly, the Association adjourned to meet at Indianapolis on the second Wednesday in September, 1884.

CONSTITUTION AND BY-LAWS.

ARTICLE I.

SECTION I. The name of the organization shall be The Roadmasters' Association of America.

ARTICLE II.

SECTION I. The officers of this Association shall be a President, First Vice-President, Second Vice-President, Secretary, Treasurer and the Executive Committee, consisting of five members, including the President and Secretary *ex officio*. The President shall be Chairman of the Executive Committee.

SECTION II. The officers shall be elected by ballot, and a majority of all the votes cast is required to elect. No officer to be elected for more than three consecutive terms, of one year each. except members of the Executive Committee. They shall be elected one for one year, one for two years, and one for three years. At regular annual meetings hereafter one member shall be elected for three years.

SECTION III. The President, or, in his absence, one of the Vice-Presidents, in order of election, shall preside at all meetings. In case of absence of both President and Vice-Presidents, the members may elect a President *pro tem.*

SECTION IV. The Secretary shall keep the records of the Association and Executive Committee, conduct all correspondence, issue notices of all meetings of the Association and Executive Committee, and shall collect all fees and dues, pay them over to the Treasurer, and take his receipt therefor.

SECTION V. The Treasurer shall keep the accounts and be charged with all the funds of the Association, and disburse them under the direction of the Executive Committee. He shall, at the annual meetings, or at any other time if required by the Executive Committee, furnish a statement of the funds, income, and expenditures of the Association.

SECTION VI. All bills against the Association must be approved by the Chairman of the Executive Committee before they shall be paid.

SECTION VII. The Executive Committee shall have the general management of the Association. Three members of this committee shall constitute a quorum at any regular or called meeting of the committee.

SECTION VIII. Vacancies may be filled *pro tem.* by the President.

ARTICLE III.

SECTION I. Regular annual meetings of the Association shall be held on the second Wednesday in September. Special meetings of the Association or the Executive Committee may be called by the President, if, in his judgment, it is for the interests of the Association to do so. Ten members of the Association shall be a quorum at any regular or called meeting of the Association.

SECTION II. The place of holding the annual meeting shall be designated by a majority of the members present at a regular meeting.

SECTION III. The order of business shall be as follows:

1. Opening ceremonies.
2. Reading the minutes of the last regular and any intervening meetings.
3. Enrollment of new members.
4. Reading communications.
5. Reports of committees.
6. Unfinished business.
7. Miscellaneous business.
8. Discussion of proper questions relating to duties of members, and appointing committees.
9. Election of officers for the ensuing year.
10. Choosing place of next regular meeting.

ARTICLE IV.

SECTION I. No person shall become a member of this Association who is not a man of good moral character, and who is not a roadmaster in good standing. If such he may become a member by paying a membership fee of two dollars and fifty cents, and subscribing to the Constitution and By-Laws.

SECTION II. The Executive Committee shall have power to levy assessments upon members for the necessary expenses of the Association.

SECTION III. Any member may be expelled from this Association by a two-thirds vote of the members present at any regular meeting.

ARTICLE V.

SECTION I. This Constitution shall be subject to revision at any regular meeting of the Association by a vote of at least two-thirds of all the members present.

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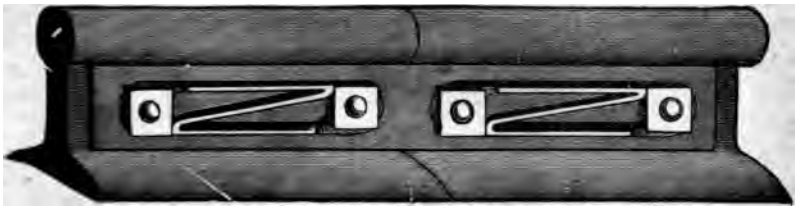

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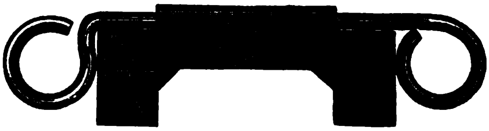

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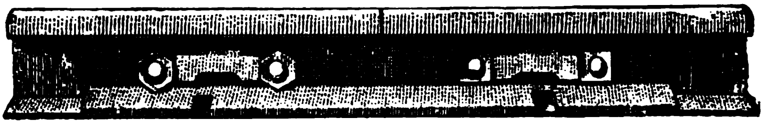

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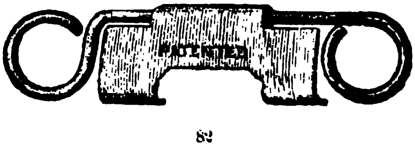

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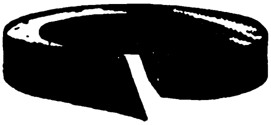

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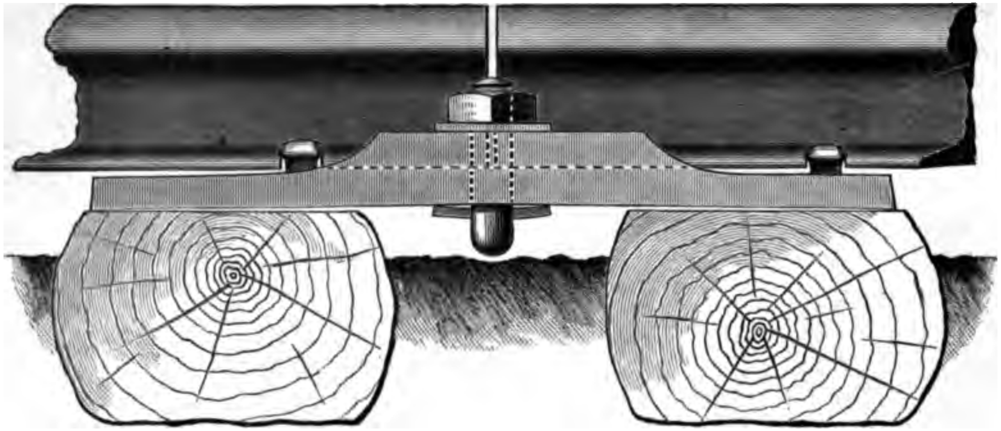
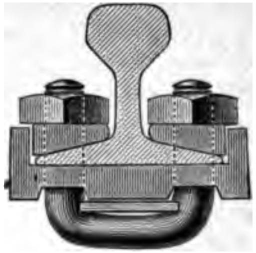


END VIEW.



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This Fisher Joint permits the use of any section of rail, and therefore the best shape for wear and strength is available with it. The U Bolts, supporting beam and all parts of the Fisher Rail Joint, may be increased in size and strength to any desired extent for heavier work, without in any way weakening the rail itself. In the Fisher Rail Joint the nuts do not become loose, because they are screwed down with a three-foot wrench harder than any strain subsequently put upon them, and there is nothing to incline them to get loose any more than the vertical bolts of a truss bridge.

The Standard Fisher Rail Joint requires no injurious preparation of the rail for fitting to it — it preserves its full strength in all parts. The Angle Bars and all forms of Fish Bars require drilling of the stem of the rail to permit the bolts to pass through. Recent tests of steel rails prove that every rail so prepared loses more than FIFTY PER CENT of its strength — in other words, so much is sacrificed to obtain the Angle Bar fastening.

Finally, laying tracks with this Joint can be done more rapidly than with any other, as it is not required to be taken apart.

These Joints cost more than the Angle Bar fastening, because they must necessarily be made of greatly superior material, with more accurate fitting and more careful workmanship. But they accomplish perfectly what that never has, *viz.*, making and maintaining the ends of steel rails as secure and enduring as any other part of the track. And the extra first cost is more than saved subsequently by the much less cost of keeping the Joints up and in repair than when either Fish Bars or Angle Bars are used.

—+ THEY ARE FULLY WARRANTED AGAINST BREAKAGE OF ANY PART. +—

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JOHN ADAMS, Esq., Gen'l Supt. F. R. R.:

Dear Sir,—In reply to yours of the 16th inst., will state that I think the Fisher Joint, as now in use on this road, is the best Joint of which I have any knowledge, and should have no hesitation in recommending its use.

Yours truly,
E. K. TURNER.

MR. ADAMS, General Superintendent:

Dear Sir,—Yours in regard to the Fisher Joint is at hand. The F. R. R. Co. have used them for a number of years, and no other Joints either on the main road or branches. I have always considered them the best Joint in use, or the best I have seen, and I still have the the same opinion of them.

Yours truly,
L. J. SPAULDING, *Roadmaster*.

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Yours, etc.,
A. A. FOLSOM, *Superintendent*.

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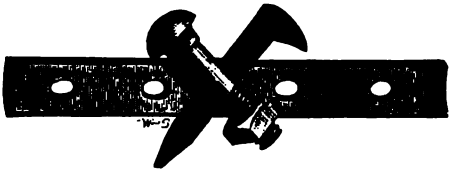

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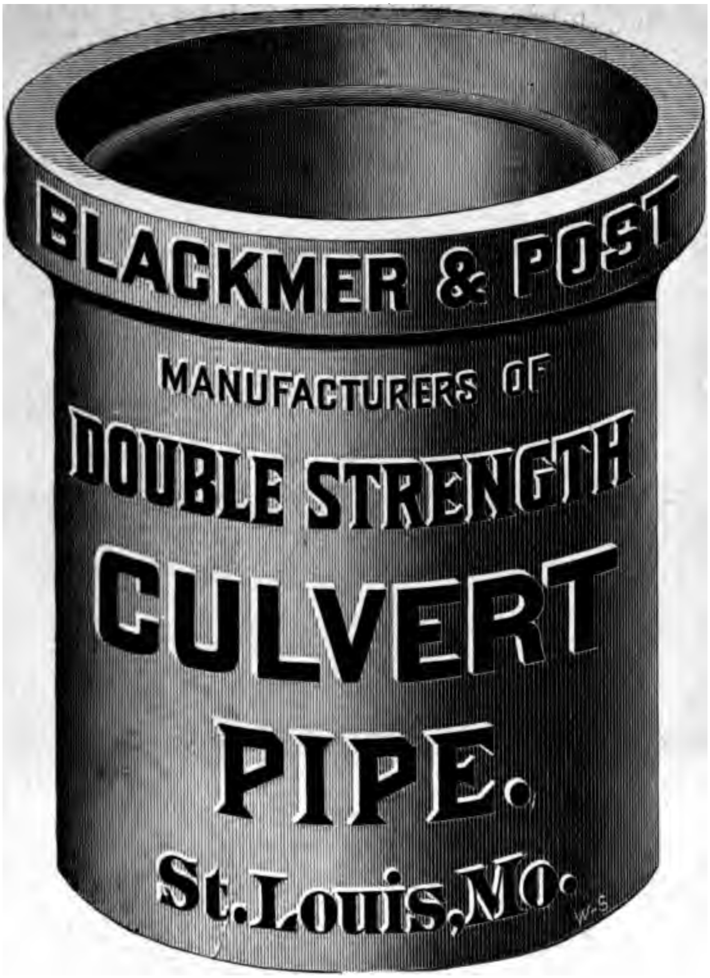

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OF THE

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OF THE

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OF

AMERICA,

HELD AT

INDIANAPOLIS, IND.

At Pfafflin's Hall,

September 10, 11 and 12, 1884.

PRESENTED WITH THE
COMPLIMENTS OF THE AJAX FORGE COMPANY,
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NOTICE.

This book is presented to the Roadmasters' Association of America, by the Ajax Forge Company of Chicago. This Company manufactures all kinds of Railroad Frogs, Switches, Crossings, Switch Stands, and all other track material, making a specialty of the "Clarke-Jeffery Split" Switch. Their Offices are in the Adams Express Building, Chicago, 185 Dearborn St., Rooms 5, 6 and 7.

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C. H. Cornell	C. M. & St. P	Dubuque, Iowa.
T. A. Hern	C. M. & St. P	Calmar, Iowa.
Joseph Hayward	K. C. St. J. & C. B	St. Joe, Mo.
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PROCEEDINGS OF THE
SECOND ANNUAL CONVENTION
OF THE
ROADMASTERS' ASSOCIATION OF AMERICA,
HELD AT
INDIANAPOLIS, IND., AT PFAFFLIN'S HALL,
September 10, 11 and 12, 1884.

FIRST DAY'S PROCEEDINGS.

At 2 o'clock, P. M., the President, Mr. I. Burnett, of the Chicago, Rock Island & Pacific Railway, called the Convention to order as follows:

GENTLEMEN—The hour having arrived to which this meeting was adjourned at St. Paul, we will now consider ourselves as an organization open for business. Allow me, gentlemen, to introduce to you the Honorable Mayor of this city, Mr. Jno. L. McMaster.

ADDRESS OF WELCOME BY THE MAYOR.

Mayor McMaster said:

MR. PRESIDENT AND GENTLEMEN OF THE ROADMASTERS' ASSOCIATION—I did not come here to make any speech. I have had no time to prepare any speech. I have simply come to meet with you here in your opening. While you are called Roadmasters, as I understand it, I do not understand that you are " Road Agents," or anything of that kind—*a la* James Brothers. I do not understand that you have come here with any designs either upon our persons or upon our purses. Your duties, as I understand them, are to protect life and property. And as the Mayor of this city, I have come here to extend to you a

MOST CORDIAL WELCOME,

to extend to you the courtesies and the hospitality of our city. Your Association, while it may be young in years, is certainly important in its objects. Twenty-four years ago, in this country, we had some 30,000 miles of railway. Most of that railway was a single track. Now, as I understand it, we have something like 115,000 miles of railway in this country, much of which is double track. The members of your Association, as I am informed, are the men who watch over, care for, and look after the maintenance of this track, of the roadway, of the bridges. This is certainly a very important thing. To your skill, to your intelligence and to your fidelity we commit ourselves, our wives and our little ones, as we travel over the railways of this country, either for purposes of business or for purposes of pleasure. I wish to say then again, in conclusion, that we welcome you to our city. I hope your stay here may prove both pleasant and profitable. It certainly will be to you to meet here and interchange with each other the ideas which you have obtained, the results of your experience in your several departments.

So in conclusion, again, I welcome you to this city of ours, and I hope when you return to your homes you may find your friends in good health, and that you may bear with you the most pleasant recollections of your visit to this city. [Applause.]

On motion, Mr. John Sloan, of the I., B. & W., was made Secretary, *pro tem.*

Mr. Benj. Weaver, of Danville, Illinois, was made official stenographer of the Convention.

The Secretary called the roll, and the following members answered :

I. Burnett	Chicago, Rock Island & Pacific Railway.
R. Steen	Chicago, Milwaukee & St. Paul Railway.
F. X. Galarneau	Lake Erie & Western Railroad.
P. J. Callahan	Chicago, Milwaukee & St. Paul Railway.
John Doyle	Detroit, Lansing & Northern Railroad.
W. L. Robbins (formerly)	Evansville & Terre Haute Railroad.
C. E. Jones	Chicago, Burlington & Quincy Railroad.
Thomas Adamson	Ohio & Mississippi Railroad.
J. C. McQuiston	Cincinnati, Indianapolis, St. Louis & Chicago
T. J. Kelley	Cincinnati, Indianapolis, St. Louis & Chicago
James Sloan	Chicago & Eastern Illinois Railroad.
R. R. Houghton	Wabash, St. Louis & Pacific Railway.
Thomas Rafferty	Chicago, Milwaukee & St. Paul Railway.
J. H. Preston	Chicago, Rock Island & Pacific Railway.
J. A. Crippen	Des Moines & Ft. Dodge Railroad.
J. H. McDonald	Chicago & North-Western Railway.
Thomas White	Chicago & Alton Railroad.

Names of Members joining THE ROADMASTERS' ASSOCIATION OF AMERICA, at Convention convened at Indianapolis, September 10, 11 and 12, 1884:

Pat. Lynch	I. B. & W.	Kenton, O.
I. B. Witty	I. W.	Indianapolis, Ind.
H. W. Reed	S. F. & W.	Savannah, Ga.
T. O. Morris	C. I. St. L. & C.	Indianapolis, Ind.
James Ryan	C. & E. I	Danville, Ill.
P. Nolan	N. O. & T. R	Oakdale, Tenn.
C. Buhrer	C. St. L. & P.	Cambridge, Ind.
E. R. Mills	Southern Central	Moravia, N. Y.
A. J. Diddle	I. B. & W.	Indianapolis, Ind.
J. H. Pearson	L. N. A. & C.	Louisville, Ky.
James Rogers	L. N. A. & C.	Louisville, Ky.
J. W. Craig	C. & S.	Charleston, S. C.
John Butler	I. C.	Pontiac, Ill.
John Sloan	I. B. & W.	Indianapolis, Ind.
M. J. Griffin	N. Y. W. S. & B.	Kingston, N. Y.
C. Gogerty	N. P.	Billings, Mon. Ter.
F. E. Sanger	St. L. K. & N. W.	Keokuk, Iowa.
John Cummings	Can. P.	North Bay, Ont.
G. R. Shaw	O. R. & N. Co.	Portland, Ore.
M. Shea	C. N. O. & T. P.	Newport, Ky.
George Bennett	U. P.	Lincoln, Neb.
E. Brown	U. P.	Rawlins, W. T.
G. W. Merrill	L. S. & M. S.	Hillsdale, Mich.
D. H. Lovell	Penn. Ry.	Renovo, Pa.
W. R. Beauprie	C. & W. I.	Auburn Junc., Ill.
W. Ervey	C. M. & St. P.	Sigourney, Iowa.
J. H. Collopy	N. Y. C. & St. L.	Bellevue, O.
James McBride	W. St. L. & P.	Jacksonville, Ill.
J. F. Salter	Miss. & Tenn.	Sardis, Miss.
L. E. Atherton	C. B. & Q.	Keokuk, Iowa.
M. McDonough	Texas P.	Marshall, Tex.
E. M. Phelon	C. St. L. & P.	Millbank, Da.
T. V. Robinson	C. St. L. & P.	Algona, Iowa.
E. A. Boardman	U. P.	Golden, Col.
J. L. Steiner	P. D. & E.	Grayville, Ill.
A. Solon	C. B. & Q.	Rock Island, Ill.
James M. Hall	L. & N.	La Grange, Ky.
Thomas Dwyer	M. L. S. & W.	Manitowoc, Wis.
A. Harley	A. T. & S. F.	Emporia, Kan.
D. McEntaffer	W. & L. E.	Norwalk, O.
J. A. Finn	N. P.	Billings, Montana.
P. D. Burke	C. P.	Colgary Alberto.

P. Peters	A. T. & S. F	Topeka, Kan.
G. R. Campbell	O. C	Bucyrus, O.
D. Coleman	A. T. & S. F	Topeka, Kan.
George Weight	A. T. & S. F	Topeka, Kan.
F. W. Meeds	A. & P	Albuquerque, N.M.
J. F. Morgan	N. P	Missoula, M. Ter.
Charles Melville	W. St L. & P	Havana, Ill.
L. Erickson	T. C. & St. L	Frankfort, Ind.
J. Tompkins	C. H. & D	Lima, O.
Frank Cox	C. R. I. & P	Atlantic, Iowa.
J. C. Smith	C. R. I. & P	Wilton, Iowa.
O. Reeves	C. & N. W	Marietta, Wis.
R. Baker	I. B. & W	Urbana, Ill.
John P. Boom	L. N. A. & C	Frankfort, Ind.
H. D. Hanover	Ohio & Miss	Aurora, Ind.
John Grogan	G. H. & San. An	Schulenberg, Tex.
M. Mahoney	W. C. & W. M	Chip'ewa F'ls, Wis.
Anthony McLeod	U. P	Junc. City, Kan.
E. M. Nichols	C. R. I. & P	Joliet, Ill.
James Guy	M. H. & O	Ishpeming, Mich.

The President said : I have a letter from Charles Latimer. I sent him an application blank and asked his opinion of it. He is undoubtedly one of the best friends the Roadmasters have in this country, holding the office of Chief Engineer. If he has any work to do, he consults with his men and finds out how they propose to do it, and if what they say agrees with his ideas, he says "go on" ; and he thinks that this organization is one of the best in the country, and should be kept up, if possible ; and I think he will be here himself to-morrow morning.

The following is the letter referred to :

CLEVELAND, O., July 5, 1884.

I. Burnett, Esq., President Roadmasters' Association of America, Joliet, Illinois :

DEAR SIR—Your letter of the 4th instant, together with application for membership, duly received. I think that sending these to the old members would probably be objectionable. It would be better to write them a letter asking them if they will not still hold themselves as belonging to the membership; they would not consider themselves as yet given up. Ask them if they will not continue in the new organization, and if so, will not they pay the fee, so as to sustain it? I think it is very important to keep up the organization. I advise the organization, by all means. I think that the application should be changed in some respects, and I send it back to you with the changes proposed. I would not require any recommendation, as I think their being on a road as Roadmaster is sufficient. Let it be as democratic as possible; I do not mean democratic in a political sense. I do feel an interest in the work and will try to be present at the meeting. Yours very truly,

CHARLES LATIMER,
Chief Engineer, N. Y. P. & O. R. R.

The Chairman — I have another letter, which is as follows:

CLEVELAND, O., March 31, 1884.

I. Burnett, Esq., President Roadmasters' Ass'n of America, Joliet, Ill.:

DEAR SIR — I would by all means send our Roadmasters the proceedings, and stir up their interests again.

I would send them to some of the Superintendents, if you have a large supply. You might send them to all; the prejudices of some are very strong, however. Yours very truly,

CHARLES LATIMER,
Chief Engineer, N. Y. P. & O. R. R.

BUCYRUS, O., Sept. 8, 1884.

I. Burnett, Esq., President and Acting Secretary of the Roadmasters' Association of America, Indianapolis, Ind.:

DEAR SIR — I regret very much not being able to attend your interesting and valuable meeting; interesting to me because I have never had the honor of meeting with so many old veterans of the rail valuable because I would get new ideas about track and fixtures. I deem your convention one of the best to the interest of railroad corporations, from the fact that the time has arrived, and facts clearly shown that the track department is second to none in the railroad service. A good road-bed, firmly ballasted, with good ties and 65-pound steel, with good substantial fastenings, and good solid frogs and switches, is a good nerve tonic, besides being a great saving, and a $1.10 mechanic is the cheapest mechanic employed by a railroad company.

In the bridge department, I believe in good, substantial stone and iron work—arch work if practicable.

My reasons for not attending your meeting, is that on the first of this month the bridge and building department of our road was temporarily assigned to me, our bridge superintendent, Mr. Barnes, having had a similar and better position offered him on his old road, the Evansville & Terre Haute, which he accepted, and having a number of new buildings and bridges under construction, together with the repairs of the old, and four gravel trains and a steam shovel in full blast, occupies nearly all my time.

Enclosed I hand you my application for membership of your Association, with post-office order for $2.50, which I hope you will accept.

Yours respectfully,
GEO. R. CAMPBELL, Roadmaster.

REPORT OF COMMITTEE.

The Chairman—Reports of committees will be next in order. There is but one committee, I think, to report, and that was on securing a place for holding this meeting and hotel accommodations.

J. C. McQuiston, of C., I., St. L. & C., a member of the Committee, reported orally as follows:

Mr. President—I have been out of the city for several months, and what little I have had to do with it was by correspondence. Mr. T. O. Morris, who is now Roadmaster of the C., I., St. L. & C. road, and Mr. Moore have made these arrangements. I have corresponded with them since my return, however, and have seen some of the parties. I will just state that the use of this hall is generously donated to us by Mr. Theodore Pfafflin, whose music store is under this hall, who is a worthy citizen, and a great friend to railroad people; and all these other arrangements have been made by Mr. Kelly, with the assistance of Mr. Morris and Mr. Moore.

On motion, the report was accepted, and the committee discharged.

President Burnett—Gentlemen, I am informed that Mr. Sherwood, Superintendent of the C., I., St. L. & C. road, tenders to this organization a special train to leave Indianapolis at any hour of any day that will suit your convenience, to convey you to Cincinnati and return. He also states that the Exposition is now being held there, and the trip would undoubtedly be of great interest to you, if you can spare the time.

On motion of Mr. Coleman, the matter of accepting the courtesies of the Superintendent of the C., I., St. L. & C. road was laid over until afternoon of next day.

The Chairman—Gentlemen, I regret very much the smallness of the attendance of old members. I find but thirteen, as checked from the list, out of eighty odd members present. It looks as if the proper interest was not being manifested, or the conveniences were not supplied the members to get away from home; consent, etc. Business, no doubt, may keep a great many away, but it would seem to me that some of them at least could get away. Certainly more than thirteen. I have no doubt this number will be largely increased before night; but that is late. It occurs to me if we agree to meet on Wednesday, that Wednesday is the day we should be here, and we should not wait until Thursday.

Mr. Doyle, of the D., L. & N.—Mr. Chairman: I would suggest that the By-Laws be so amended as to provide for the appointment of a Vice-President for every State, with a view to working this matter up and enlarging this Association.

The Chairman — I will say to the gentleman that while it would not be proper to attempt a thing of that kind now with our small attendance, if we attempt it at all, it might be considered at a time when more members are present. But, I have sent out of my office a thousand circulars. There have been eight hundred letters written in my office to Roadmasters ; and I think if there had been four Vice-Presidents in each State it would not have done us any good. If men won't come from the invitations and courtesies that have been shown them, they will not come at all. That is my opinion of it.

Mr. McQuiston—Mr. President, this has been a very extraordinary year. Many roads have been flooded. Many of them are busily engaged in construction, in laying foundations for bridges, and other structures. In other places droughts have prevailed, and they have suffered by fire ; and I know quite a number who would gladly attend a meeting of this kind if they could get away from their duties. But they are compelled to remain at home. Being remote from this point, as some of them are, it would involve some considerable expense, and that is their excuse. While that is the case with quite a large number, there are others who are just careless about coming and perhaps ought to be scolded a little.

The Chairman—I think an association of this kind is of sufficient importance to excite the interest of all Roadmasters and to engage their attention. The position of Roadmaster is one of importance to the life, support and maintenance of railway systems. Let them be negligent in their duties, and over those whom they have control, and disasters must follow. In an association of this kind one can learn from another of any and all improvements. It would seem this is the right thing to do ; and I believe the time is not far distant when this Association will not open its conventions with thirteen members only, and that within a few years, too. The younger ones who are growing up to take our places will look upon it with more respect than many of the members are now doing; at least I hope it will be so. I presume there are twenty Roadmasters here in Indianapolis, and how many of them is my friend, Mr. McQuiston, acquainted with?

Mr. McQuiston—About five.

The Chairman—Now, why is that so? They seem to isolate themselves one from another. Their business does not require that. You have spent many days in Indianapolis—I have in Chicago—when I could just as well have gone and visited some Roadmaster, had I known him. The fact of the matter is I did not know him, and I did not know where to go. In an association of this kind you get up a friendship that must inevitably bring you together more or less, and you cultivate a friendliness that does not exist now. I hope to see that time come.

Mr. C. E. Jones, C., B. & Q.—Mr. President, the reason some are not here is because they did not wish to pay their fares; they could not get transportation, and I think we should make an effort to have our Association recognized the same as other railroad associations, so that any Roadmaster having a certificate of membership of this Association will be entitled to passes over the lines of road necessary for him to travel in attending our conventions. (Applause.)

The Chairman—I think, Mr. Jones, your suggestion is a good one. I notice the Engineers, Conductors, Yardmasters, etc., have issued a certificate, which when signed by the Secretary and President of the Association, is recognized by most of the roads of this country. Before this Convention adjourns, it would be well to put this matter into shape.

Mr. Adamson, O. & M.—Mr. Chairman, I think it is hardly practical, considering the restrictions the conductors are laboring under. The usual way we have been proceeding is to ask our General Managers for a leave of absence, and in nine cases out of ten it is granted. I have never heard of a case where it was not. I think it is too much to ask the conductors to pass us.

Mr. Jones—I think the gentleman is mistaken as to what I mean. I mean for the Convention to make some effort to have a certificate of membership recognized, so that conductors will receive orders to recognize them in lieu of a pass, when properly signed by the Secretary and President of this Association.

Mr. Adamson—Mr. Chairman, that is a question for the members here to decide upon.

The Treasurer read his report, showing a balance of $61.31, over and above fees received for membership at this meeting.

Mr. James Sloan, of the C. & E. I., was called by the Chairman to the chair; whereupon President Burnett said:

Mr. Chairman—Our first question for discussion this evening will be:

"SURFACING."

MANNER OF FILLING IN AND FINISHING WITH DIFFERENT KINDS OF BALLAST.

I have noticed in discussions of questions of this character, the [illegible] and most satisfactory way to arrive at the most defi-

e of three to act as jurors, as

and when the discussions are

ority report, or a unanimous

way the matter is brought to

advisable to adopt that plan,

man appoint a Committee of

tion this evening.

ly, Galarneau and McQuiston

a recess until 7 P. M.

JOLIET, ILL.

The Ajax Forge Co. is not responsible for any errors or
issions in the Report of the Proceedings of the Road-
sters' Convention, as it was taken from the stenog-
ner's notes, and inspected and approved by me. Any
take therein found is not the fault of the Ajax Forge
npany.

I. BURNETT,
Pres't Roadmasters' Association of America.

ESSION.

The Convention met at 7 P. M., President Burnett in the chair.

The Chairman—The question for discussion this evening, as arranged prior to our taking a recess, is "Surfacing— Manner of Filling and Finishing with Different Kinds of Ballast." Will Mr. James Sloan address us on that subject?

Mr. James Sloan—I would prefer some of the older members would start that discussion. I am about the youngest in years of any one present.

Chairman—We would like to hear from you.

Mr. James Sloan—Do you want stone ballasting, or dirt, first?

Chairman—Any ballast you have been using.

Mr. James Sloan—I have been using gravel and dirt. I am through now with using dirt.

Chairman—What depth of gravel would you recommend to be put under the track?

Mr. James Sloan—Eight to ten inches of gravel under the track, I think, is necessary to make a good track.

Chairman—In what manner do you fill your track and dress it up?

Mr. James Sloan—I dress it with gravel about two inches above the top of the tie, and give a slope half way down to the center of the ties at the out edge. In filling around frogs and switches I don't fill quite up to the top of the ties. Our frog timbers are thicker than our cross ties. The frost heaves our track more than if we fill up level.

Chairman—Do you have much trouble with your track heaving, where you have eight inches of gravel?

Mr. James Sloan—No, not a great deal. We have some trouble in wide, wet cuts.

Chairman—You have never used any rock?

Mr. James Sloan—No, sir.

Mr. Jones, of the C., B. & Q. road, said—I should think, for a good, permanent road-bed, ballasted with gravel, the gravel should be at least ten inches thick, and in filling the track I would fill the center about two and a half to three inches above the tie and around it, running to and leaving a clear space under the rail, and filling out on the outside about two-thirds of the way up the tie, leaving about two inches of the tie above the gravel, so the water can have free escape from the center of the track in good ballasting. Where the ballasting is poor, then I would fill the same as I would with mud track, leaving the end of my tie free, filling heavy in the center, just leaving room enough for the water to disappear.

Chairman—Did you ever use any rock ballast?

Mr. Jones—Some; not a great deal.

Chairman—How about cinders?

Mr. Jones—With cinders, I would fill outside of the tie heavier than I would with gravel. I think the water escapes better.

Chairman—For durability, how do cinders compare with gravel for ballasting ?

Mr. Jones—I think cinders, when renewed once in about five years, make a first-class track ; that is my experience.

Chairman—Will a tie last as long in cinders as it will in good gravel ?

Mr. Jones—No, sir ; a tie will rot quicker in cinders than in gravel. Around my frogs and switches I like to fill my track as smooth as possible, leaving the track in good shape for the trainmen to go over, thereby creating less liability to accident.

Mr. Doyle, of the D. L. & N., said—We ballast our road with gravel, sand and cinders. We put about ten inches of good gravel under the tie, fill about half an inch above the tie. On cinder track we run it out to the end of the tie to the depth, at the end, of about an inch, and then run out to the bottom of the ditch. The reason I leave it higher in the center of the track is that the gravel is mixed with sand, and causes a great deal of dust when filled at the center ; but with cinders we fill clear to the top of the tie and run out to within about six inches of the end of the tie, and then slope. We fill in the frogs to the top of the tie. The switch rails we fill within about an inch, in order to keep in shape in the winter.

The Chairman—Did you ever use rock ballast ?

Mr. Doyle—No, sir.

Mr. McQuiston—I have had some little experience with rock ballast, but more with gravel. I concur with the opinion of those who have spoken on the subject of gravel, and the mode of dressing out, but I believe in putting at least a foot of gravel under the tie, and finishing up substantially as they represent ; with this difference, instead of a slope of one-half to one inch, I would make three inches until we get within three and one-half inches of the rail, then straight out—making the bottom of the ditch not less than a foot below the tie. I am a great believer in ditching, that is, when there is a clay bottom and gravel ballast.

With stone ballast, the best results I have seen is about a foot of stone put under about four inches of gravel—coarse stone first; say of such size as would pass through a two inch ring, then finish out level with the top of the tie, and a foot beyond the outer end ; from there slope off to about one, and then ditch as the situation may require. We put coarse stone at the bottom and then fill up with finer stone. I have found in some soft places it would require a considerable quantity of stone, and if they are tolerably large, flat stone, we get better results than when we use stone broken finer. They settle more evenly. We find in this black, swampy soil, the large, flat stone put in first do better service.

In gumbo—I suppose you have all had some experience in that—which is something like rubber, we fill up at the center and then slope off in the same manner.

Chairman—Take your haul and gravel together, can you give us the cost of each? About what percentage more does the rock cost to put it under than the gravel?

Mr. McQuiston—The rock costs you thirty-five cents per yard broken on the car, while gravel on the car costs about five cents. I have no actual knowledge of the cost of the latter ; but I think it would not exceed that, not counting the cost of transportation to the point where it is used. We have used gravel for a number of years, from eight or ten inches to a foot in depth under the tie. After it mixes with the mud we put four or five inches of stone on top with very good results. We get rid of dust by that operation to a very great exrent.

Chairman—Do you put gravel on top or the bottom.

Mr. McQuiston—Put gravel on the bottom, because in the event of there being soft places, the gravel holds it better. One great object is to get uniform hardness, and then as good surface as possible. I think one of the most important things connected with the maintenance of good track is thorough ditching. Almost any mode of dressing would be good if you get a good solid foundation, with thorough ditching.

Mr. Coleman—Did I understand you where you have plenty of gravel and rock both, you would put gravel on the bottom and rock on top?

Mr. McQuiston—Yes ; I would do that as a matter of economy, if the company was able to make a permanent road. For very heavy tonnage, I would prefer altogether rock. Have it broken up.

Chairman—If you have part rock and part gravel, why not use the rock at the bottom?

Mr. McQuiston—Because my experience is the gravel becomes settled by the rolling stock going over it, and you get a hard, even bed. If there are any inequalities you get it in stone, and a small quantity of gravel is valuable in that respect where there is a large passenger traffic.

Chairman—If you owned a railroad, and had rock that cost fifty per cent. more than gravel, would you use the rock?

Mr. McQuiston—I would put on rock. Perhaps there is a little more elasticity in the gravel in the summer time, but I believe in the winter time there is fully as much in the rock.

Mr. Lovell, Pennsylvania R. R.—I know very little about gravel ballast. In the State of Pennsylvania, where I have always been, all the divisions of the Pennsylvania Railroad are ballasted with broken stone, while with the exception of the main line, between New York and Trenton, all the New Jersey roads centering in Philadelphia are gravel ballasted. The chief recommendation of stone ballast is its freedom from dust. I admit stone is not as smooth as gravel, and while very expensive, its first cost is offset by its permanency. Its price ranges from 80 cents to $1.00 per yard, and it costs from 15 to 20 cents more per yard to put in track. Limestone, I consider, the very best kind of ballast, when broken to proper size. For a good road there should be at least six inches under ties and spaces between filled almost to top of ties, and border at ends neatly sloped. I do not believe in a combination ballast, that is, part stone and part gravel—it should be all stone or all gravel.

Mr. Morris—I would like to ask the gentleman one question. He says the most desirable feature about rock ballast is its freedom from dust. I would like to ask him what he considers the most undesirable feature of rock ballast?

Mr. Lovell—First, its expensiveness, which, in addition to the first cost in the track, includes handling when making renewals or repairs; and, second, where traffic is heavy I am inclined to the opinion that it is harder on the rail.

Renewals of ties are very much more difficult in stone than in gravel, the trackmen preferring to renew in a "string" or "face" rather than "spot" them in; but that is too expensive fo practice.

Mr. James Sloan—Would a gang of eight men take the stone out and put in eighty ties a day and surface it?

Mr. Lovell—Oh, no. They could put the ties in and make the track safe, but not finish it.

Mr. Doyle—Will steel or iron rails wear longer on gravel or stone?

Mr. Lovell—I am not prepared to give a positive answer, but I am inclined to think, from my observation, that the tendency is to wear out more rapidly on stone ballast than on a gravel.

Mr. Doyle—You do not think you can get as nice a track on stone ballast as you can on gravel; that is, not so nice surface.

Mr. Lovell--No; I hardly think it is possible, although on the New York Division there is a piece of track about thirty miles long where it is possible, when in its best condition, to preserve the equilibrium of a glass almost filled with water at a speed of from fifty to sixty miles per hour, and the track ballasted about equally with broken stone and with gravel. In a few years desirable results can be obtained as to the relative merits of stone and gravel.

Mr. Doyle—What do you use, suspended joints or tie under the joints?

Mr. Lovell—We have suspended joints, using double-angle splices.

Mr. Doyle—Don't you think, where you break the joints, you get more oscillation?

Mr. Lovell—I think experience generally favors the broken joint.

Mr. White—I think we are not keeping to the straight line of our discussion this evening. I would rather we would stick to the ballasting until we get through, and then take up some other subject.

Mr. Morris, C., I., St. L. & C.—I prefer gravel to rock. We have both kinds on our road, and the gravel gives us a much better riding track, with less wear on the rails. We think very well of the Joliet gravel, as used on the R. I. road. Gravel costs us eight cents a yard on the car, and on the track, twenty cents. We have used rock ballast seven years, and find that gravel furnishes a much better surface. We load with a steam shovel and unload with a plow.

Mr. Coleman, A., T. & S. F.—For the last two years we have been using ballast, more or less. We ditch ten feet from the rail on either side, and make a ballast slope of one inch to the foot. I prefer rock broken by hand to that broken by a crusher. It costs us seventy-six cents a yard after screening. We put in ten inches under the tie, and veneer with gravel. The depth under the tie has been reduced to six inches, which is now our standard, but I am opposed to it, as in wet weather the mud comes through. With gravel I ditch the same—one in one. Gravel costs forty-two cents on the car. We fill the track in the center, and slope gradually out I think the gravel ballast best. It is more economical, in the first place, and even at the same price I would prefer it to stone. With dirt track we slope and ditch two inches to the foot fall. We use cinders for yard purposes, and think that the best material that can be used for that purpose.

Mr. Doyle—I would like to hear from some gentleman as to what it costs to load gravel and haul it five miles, and put it under the track.

Mr. Mills, Southern Central—I could answer the gentleman's question in the morning. We use no rock ballast on our road. We use gravel and locomotive cinders. We don't allow our engines to dump on the main track at all. I have two yards for them to dump in. We have very fine gravel banks on our main line I think some portions of gravel track ride better than rock ballast. I think rock ballast keeps freer from weeds and cleaner, and in that respect there would be economy in using it.

Mr. Lovell—On the Pennsylvania road we are troubled with a growth resulting from the droppings of grain from the cars. The rock ballast helps to keep that down.

The Chairman—The gentleman wanted to know what it would cost to take out gravel, haul it five miles, and put it under the track, loading with steam shovel. Can anybody tell?

Mr. James Sloan—I get it out for twenty-five to thirty cents a yard, and haul it 150 miles, and put it under. I load it by hand.

Mr. Lovell—Did that include train service?

Mr. James Sloan—No, sir; he did not ask that.

The Chairman—That was for loading the gravel and putting it under the track?

Mr. James Sloan—Yes.

Mr. McQuiston—It has cost our company fourteen cents a yard to load and haul seventeen miles. It costs ten cents more to put it under the ties.

Mr. Melville—We contracted to load our gravel at seventeen cents a yard. Unload with a plow. The cost, when we unload with a plow, is merely nominal. I would count it five cents to the car, probably. That would be big.

Mr. Doyle—I was trying to get at whether it was cheaper to handle gravel by hand or with a steam shovel. We haul it ten to fifteen miles, using a steam shovel, unload it with a plow, at twenty-four cents. I am told it can be done cheaper.

Mr. Melville—It costs me about eighty-seven cents per car by hand.

The Chairman—I will say that last year I loaded 2,600 car loads of gravel, and for that we paid twenty-five cents per car load; that is for the gravel proper. I loaded it with a steam shovel, at a cost, including the engine service, engineer and fireman, and three brakemen upon the train, allowing engine service at ten dollars per day, and nothing for cars—I loaded that gravel for six cents a yard, hauled it out and unloaded it by hand and put it under, and it cost us 27½ cents a yard, all told—that is less the cost of the gravel. I used 10-inch side-boards and 30-foot flats.

Mr. Doyle—The cheapest I can load gravel on the car at the pit is eight cents per yard.

Mr. Lovell—In discussing this question, the difference in wages paid should be taken into consideration.

Mr. Buhrer, Pan Handle—I have been loading at the rate of about 75 or 80 cents a car load in the pit. I have been unloading with the section men. It don't cost me anything to unload, you might say.

The Chairman—Oh, yes; I see. [Laughter.]

Mr. Adamson—My experience is principally with dirt and gravel. I very seldom load by hand. The ballast costs six to eight cents a yard. Some rock ballast which I have used cost 20 cents a yard, unbroken. The section men did the breaking at their leisure.

Mr. John Sloan—Your section men are fortunate in having leisure.

Mr. Houghton, Wabash—I have about sixty miles of gravel, about sixty-five miles of stone and some distance of cinders. About eight miles of the rock I put in five years ago. That rock cost us five dollars a car load of eight yards, actually about seven yards. They load it and we haul it out. They unload it and break it by hand on the ground. Our rule is it should be broken so the largest stone would go through a three and one-half inch ring any way you put it. It costs five dollars a car load, broken and delivered in that way. And it costs about thirty cents a yard to put it under. The first eight miles we put in we tamped the ties clear across solid. So far as my experience goes it is a failure. The center of the track will remain solid and the ends of the ties become loose and rock a little. And for the last two years we tamped the ends of the ties solid for about twelve to fifteen inches inside the rails ; tuck it under a little at the center, and we find it stays in line better. We fill the track about level to the top of the ties clear through and six inches past the end of the ties.

Mr. Coleman—My experience is that is the way it will work with all material, if you tamp it all the way across solid. And that accounts for so many broken ties, because they don't have a uniform bearing.

Mr. Houghton—I widen my embankment seven inches from the rail. I prefer rock ballast every time. I am certain in the winter time when the track is frozen there is not as much wear on the rail on rock ballast as there is on a gravel and sand. We have less breakage of rails of the same kind on the stone than any other ballast we have in the winter.

The Chair—How do you account for that ?

Mr. Houghton—More or less this way : The stone does not freeze so solid and heave up.

The Chair—In filling in the rock, do you fill up to the top of the tie ?

Mr. Houghton—Yes ; very near. I have got about a mile of track ballasted with charcoal furnace cinders, which I consider "a number one" ballast.

Mr. Lovell—I would say on the west end of the Pennsylvania, on the Southwest Branch, near Pittsburgh, where it is plentiful, ordinary furnace cinder is used considerably, the objection to it being, I believe, that the lime in it causes it to disintegrate in course of time. The Philadelphia & Reading Railroad use a very excellent cinder ballast; the cinder, I believe, when coming from the furnace, is run into water, which breaks it up into coarse, flint-like sand, which is elastic, and does not pulverize.

Mr. Melville—We have had 15 miles of the Wabash, between Springfield and Jacksonville, laid with cinders for four years. It has never been repaired.

Mr. John Sloan—I think the tracks laying east and west are more subject to heaving than north and south roads. The north and south tracks are more even than east and west tracks.

Mr. James Sloan—Yes; I believe that, for they are snowed under most of the time.

Mr. Witty—I would say that as a matter of economy, in replacing the ties, smoothness of track, life of rail, and rolling stock, the gravel ballast is the best.

Mr. Doyle—We have 40 miles of track ballasted with sand. It is about the best track we have. We fill it clear full, run it out to the end of the tie. It is best in wet weather. We never have any trouble with that heaving, and the iron wears splendidly. The ties wear out in about five years. Most any kind of tie will, unless it is cedar.

The Chair—Will the water go through sand as quickly as it will through nice gravel?

Mr. Doyle—Yes; I think it will go through more quickly. The reason of that is, generally when you put sand there is a sandy sub-soil, and when you put gravel it is generally on clay.

Mr. Lovell—I would like to know what is the life of a cross tie, chestnut or hemlock, in sand or gravel?

Mr. Doyle—Hemlock lasts five years; oak, seven to eight years in sand. Hemlock will wear out in gravel in five or six years.

The Chair—This question will now be given into the hands of the committee appointed for the purpose of hearing the arguments and the discussion; and they will report at their earliest convenience.

Mr John Sloan—I move that the question of ballast be continued to our next meeting.

Mr. Coleman seconded the motion. Carried.

FROGS AND SWITCHES.

The Chair—The next subject for discussion is the matter of "Frogs and Switches." This is a matter we are all interested in, more than in any other one thing. The railroad companies are, we know.

Mr. John Sloan—Mr. President, I move that the Chair appoint a committee of three to hear the discussion of the subject of "Frogs and Switches," and report their conclusions thereon to this convention.

Motion carried.

The Chair appointed as such committee: Messrs. James Sloan, D. Coleman, John Doyle.

Mr. Lovell, Pennsylvania—We use the steel rail frog. Cast frogs are out of date with us, except in sidings, where we are wearing them out. The length of our frogs is fifteen feet. On the main track, we use the spring rail, and under certain circumstances, in yards for example, we use the stiff rail. The standard numbers are 6, 8, 10, 12 and 15, No. 8 being for general use, and Nos. 12 and 15 are for passing sidings and for turning from a double to a third track. We use for the main line the 67-lb. rail, and for branch divisions 60-lb. rail, the 67-lb. being generally adopted.

We have been using for a number of years, until recently, the Wharton switch, twenty-four feet long; but now we have what is commonly known as the point or split switch, eighteen feet in length. It used to be that the split switch was considered unsafe when running against the point; but it has been sufficiently demonstrated on branch divisions that there is no particular danger, and it has the advantage over the Wharton of being cheaper in the first cost, although its life may not be as long. We do not use any stub switches in our main track.

The Chair—Do you use any spring connected with your split switch?

Mr. Lovell—We do; but in the spring there is a thimble which can be so adjusted, that while it permits the spring to be free to act for the one side, it prevents it for the other, and makes the switch for one side equivalent to one with the rigid rod.

The Chair—At the opposite end of the track, in running away from the point, do you leave the spring of that end to work free for the siding or main track?

Mr. Lovell—It works rigid for the main track. On double track, so far as possible, switches are put in so as to run against the heel, so that the danger is not so great as running against the point—and the spring does very well.

The Chair—On a single track your spring is set for the main track?

Mr. Lovell—Yes; locked, to prevent any snow or anything getting in it to prevent its closing up tight.

The Chair—What do you consider the comparative difference in the life of a spring rail frog and a rigid rail frog, with an equal amount of traffic?

Mr. Lovell—I am rather of the opinion that the life of the spring rail frog is greater than the stiff rail frog. There are a great many things to be taken into consideration in deciding that question.

The Chair—Did you ever have any accidents occur from the spring rail frog being blocked with snow, ice, or anything of that kind?

Mr. Lovell—I cannot recall any, though I am aware that ice forming under the spring rail is troublesome, but a little salt and attention prevents it. The objection to the spring rail is from its breaking, which it is liable to do from badly worn engine tires.

The Chair—Do you have any spring attached in any manner to the spring rail?

Mr. Lovell—Between the point and toe of frog there is a bolt connecting the spring rail with the other wing rail, and around this bolt at the end there is a spring.

The Chair—In this switch (producing tracing), do you use the ground rail as shown by this drawing?

Mr. Lovell—They overcome that by a plate and strap.

The Chair—Did you ever use or see the Tracy switch in use?

Mr. Lovell—No, sir.

Mr. John Sloan—We are adopting on our road the split switch—the "Clarke-Jeffery" patent. We have a frog rigid on both sides. I think the "Clarke-Jeffery" split switch is fully as good as the Wharton switch. I have seen two or three of the Wharton used on different roads. I think the "Clarke-Jeffery" switch will give as good service. The majority of them will last on our Western roads six to eight years, and they will cost not more than one-fifth as much as the Wharton switch. We use 1 and 9 frog standard; 15-feet rail for split switches. We are now using the Morden frog, manufactured in Chicago. We use his frog exclusively.

The President—Have you examined the frog manufactured by the Ajax Forge Company, now on exhibit at the hotel?

Mr. John Sloan—Yes, sir; and think well of it.

The President—In your opinion, how does it compare with the Morden frog?

Mr. John Sloan—I have never used this Ajax frog, yet from its appearance I think it far superior to the Morden.

Mr. Lovell—Have you ever used a spring frog?

Mr. John Sloan—No, sir; not on the road I am now connected with; yet I have seen them in use, and have formed a good opinion of them. I believe a large number of the new appliances are not given a fair trial from the first. They are placed in the hands of those who are opposed to them, therefore neglect them; don't give them proper care.

Mr. Doyle—We use the Morden frog on our main line. We have a branch that has got the spring frog that has been used for nine years, and it is good yet—one spring rail, the other stationary. When we started out on our road we had the double spring frog, got up by Mr. Woodward, of Ypsilanti, Mich. We had them over eight years. We never had any accidents with them. My experience is that the spring frog, one spring rail and the other stationary, is the best frog.

The Chair—Do you use any of Morden's frogs now?

Mr. Doyle—Yes.

The Chair—Do you ever use the rigid frog where both rails are riveted to a plate under them?

Mr. Doyle—Yes.

The Chair—Will the Morden frog last you any longer, and if so how much, than the frog riveted to a plate?

Mr. Doyle—I don't think it will last so long. The experience I have had with the riveted frog was on the Michigan Central road. They use most all riveted frogs, and I think they will outlast any other stationary frog.

The Chair—That is, a frog riveted to a plate?

Mr. Doyle — Yes; but there is one thing about your frog riveted to a plate, when your wing rail gives out you have to take your frog out and take it to the shop.

The Chair — That is when repairing becomes necessary by reason of the wing rail being battered down?

Mr. Doyle—Yes.

The Chair—Then is your frog when repaired as good a riding frog as it was before?

Mr. Doyle—No, sir.

The Chair—Then will it pay to repair those frogs to put out on main lines?

Mr. Doyle—I think it would pay to repair them to put along on side tracks.

The Chair—Then is there any advantage in the Morden frog over the frog that is riveted to a plate?

Mr. Doyle—No, I don't think there is; I think I would rather have a riveted frog.

The Chair—Have you seen the stiff frog at the hotel made by Ajax Company?

Mr. Doyle—Yes; I think it the best stiff rail frog I ever saw.

Mr. Lovell—Would you consider it safe to put in a new wing rail on an old frog?

Mr. Doyle—Yes; but I would not put the same weight of iron there.

Mr. Lovell—Would you put 67-lb. wing rail against a 67-lb. frog that had been worn down a year or two?

Mr. Doyle—No; for instance, take a frog made of 56-lb. rail in the first place, we have a 52-lb. rail not worn. When the first wing rail is worn out I would substitute the second one. I have known wing rails to break at the point, never caused any accident though, because the rails we put in are about 20 feet long, and are spiked down with 20-inch chairs, so when the train runs through, the guard rail holds it on. So that I don't think if the wing rail did break you could get the train off. We have never used split switches. We contemplate using the "Clarke-Jeffery" switch.

Mr. James Sloan—We have some with springs and some without springs. I should prefer those without springs; I think it is more easy to discover if anything is out of order.

The Chair—Do you think roadway work is properly done in the shop?

Mr. James Sloan—I think the work for the road department is slighted in the shops all over the country. I don't think they take the interest in our shops they ought to.

The Chair—You would recommend reform?

Mr. Sloan—Yes, I would.

Mr. Melville—I can't say anything about switches. Our standard is the Elliot frog, 1 in 8. On one division I am on, we have been using the old-fashioned turn-over frog, two sides to it. If we get tired of one side turn it over, and when we get tired of that turn it back. In speaking of riveted frogs, I have one crossing that is riveted on boiler plate ¾-inch. I have a great deal of trouble with the rivets breaking about every three months. I keep two sets there; crossing in nice line, 18 inches of cinders under it. I think there is too much solidity. The rivets invariably start in the center to break, in the middle of the frog. The crossing is a regular fork—two long and two short frogs.

The Chair—Did it ever occur to you that the gauge of the wheel might have something to do with that?

Mr. Melville—No, sir; it might in one or two cases, but why should it generally?

The Chair—If the wheel is gauged upon a journal so that it stands between the two outer sides of the flange 4-4½ to 5¾, does that cut any figure with your frogs?

Mr. Melville—I don't see why it should. Because that wheel travels between the two points; but, at the same time, when it is leaving those points on the flange side it has got on the outside on the other point.

The Chair—Do the Elliot frogs give general satisfaction?

Mr. Melville—Take it on the whole, yes. I have had two points break in the last eighteen months. I had the Elliot frog, but they were old and had been worn a good while. I have used the Morden frog. In my opinion the Elliot frog is the best.

Mr. James Sloan—Don't it require a good many bolts to keep the Elliot frog together?

Mr. Melville—Yes. There is one feature of these frogs that is bad, that is the filling. That is the main trouble with my frogs.

Mr. Lovell—The Pennsylvania Company makes a frog that has two clamps held in place by wedges of casting. I don't know that I am very much in favor of the Pennsylvania frog. We use the riveted frog, too. I consider the Wharton frog a much superior frog.

Adjourned until next morning at 8:30 o'clock.

SECOND DAY'S PROCEEDINGS.

The Convention met at 8:30 A. M., President Burnett in the chair.

Mr. James Sloan—I am in favor of hearing a few remarks from our President, Mr. Burnett.

Agreed to.

President Burnett then addressed the Convention as follows:

Gentlemen of the Roadmasters' Association of America:

At the close of the first year of our existence as an Association, your President feels to congratulate you all upon the increasing popularity of our organization.

The managers of the different railroads, realizing the important relations in which our department stands to the welfare of their business, seem pleased to have us come together once a year to consult upon those interests under our immediate supervision. The men, occupying similar positions to ourselves, as the object of our Association is brought to their knowledge, readily discover the benefit to be derived from interchange of thought, and express their determination, not only to join our Association, but to be present at its meetings. By so doing they may often learn from the experience of others, so as to avoid serious mistakes and at the same time profit from real successes. A wise father once said to his son: "My boy, experience is the best teacher, if you do not pay too dearly for the lesson."

That information which is derived through the hard, dry channel of personal experience is undoubtedly most heeded and lasting, but with the tremendous interests at stake, with the millions of lives that are daily dependent upon the thorough work of the Roadmasters of America, no room is left for experiments. To learn by experience, in every instance, what is the wisest course to pursue, would be paying too dearly for the lesson, as numerous disasters in the past have clearly demonstrated.

This is pre-eminently a railway age. The locomotive is the distinguishing feature of this generation; without it, the prairies would remain unsubdued, immigration be almost unknown, the great cities of the interior would be an impossibility, the mountains would still firmly grasp their precious metals, the mills and manufactories that grace our streams, or are found upon the borders of our cities, would be unknown, for there would be no means of bringing the raw material to their doors, nor could a market be secured for their products. Extensive touring could not be enjoyed by our people; our commercial cities would be deprived of the business of the Stock Exchange. The possibilities of vast fortunes would not be opened to our people; they would remain ignorant of a large portion of our existing lucrative industries, and would be compelled to plod in the slow methods of our ancestors.

But in the enjoyment of these blessings which result from the locomotive, little is said or heard about the class upon whom its success is in a large measure dependent. The passenger upon the quarter-deck may praise the seamanship of the captain, the courtesies of the purser, the kindness of the steward, little thinking that the rapidity and safety of the voyage is primarily dependent upon the faithfulness with which the stokers in the hold feed the furnaces and the sailors on watch look out for ships and icebergs. The names of great manipulators of stock bonds, of magnates controlling vast railway systems, are often upon the lips of the people. Praise waiteth him who, beginning in a subordinate position, rises to more exalted and trusting ones. Poets are ready to sing of the heroic deeds of engineers, while the men upon track, with small wages and by hard toil, unknown to the world, do, by their faithfulness, make possible the flight of the locomotive and success of the railway system. Let them be careless in the performance of their duties, and great disasters would inevitably result; they must be honest in their work, even though the management of the road should be in unprincipled hands. Every person stepping on board of a train takes for granted that the rails upon which his carriage is to run are in proper order. By thus committing himself to the care of the company he manifests his faith in the men who, like ourselves, are engaged in caring for the great highways of travel and commerce.

Yet there is little romance connected with the Roadmaster's service. No small number of hours, light labor, or large remuneration attend this field. All hours of day, of night, must we be subject to care and alert for danger. Responsibility can never be fully thrown aside. Like woman's work, ours is never fully done. Men of nerve, of heroic spirit, of great conscientiousness in the discharge of responsibility, men who can brave storms, can forego needed rest at times, can toil for others as if their personal interests were at stake, are required for this department of activity.

And when we consider the thousands upon thousands of miles of railway track in this country, the thousands of trains loaded with passengers, that go thundering from city to city day by day, the possibilities of accidents resulting from the broken rail, the washout and other causes; then compute the number of deaths, resulting from failures on the part of trackmen to perform their duties faithfully, surprise inevitably results because of the smallness of the number; not one in a million are injured from this cause ; computation impresses us with the fact that the men having charge of the roads of America feel their responsibility, and rejoice in the faithful discharge thereof.

It is pleasant to find ourselves in such good company. The meeting held one year ago in St. Paul, by its practical discussions, the few exchange of views it secured on subjects of vital interest to our department of labor, demonstrated the usefulness of such meetings. I can only wish that the profitable season we enjoyed there may be reflected upon this occasion. There is matter, however, to which I wish to call your attention, and in which I hope for your hearty co-operation.

We are engaged in caring for the track and road-bed, really the foundation upon which trains of living freight are drawn. We fee anxious to have our work so performed that no injury shall befall what ever is entrusted to the track over which we have supervision. But w also have large numbers of men in our employ, many of them heads families, and we should feel equally interested in their welfare, that, possible to prevent, none of these should so run off the track of tr manhood as to bring disaster upon themselves or their househol The managers of our railways, at the present time, feel much m than in past years, the necessity of improving the moral tone of th employes. Whoever is to be trusty in his department must be a r of true nerve and steady hand. Intoxicants must not be permi to fire his brain. He should secure his rest at proper times slumber, that in his waking hours, whether night or day, he ma ready for service. Under this order of things the character of rail men has gradually improved, until at the present time they are a of whom the nation may well be proud. It is in our power to f tate this movement thus inaugurated by our supervisors, th improving the working forces under our charge, and bringing enl blessings to the families.

Our men are exclusively laboring men, they earn their br the sweat of their brow; each month they receive so many for a prescribed number of days' work rendered. Theirs is unskilled labor, which most inevitably receive only the m remuneration. They therefore of necessity should save all their earnings for their families, present and prospective. While this is true, it is also equally true that quite a large percentage of our men foolishly, wastefully, spend a portion of their earnings for drink. The boarding-house keeper and the saloon pilfer from them, through the beer and whisky glass, that which they should carry home to their families. By kindly counsel, positive orders, and an occasional discharge, if need be, it is in our power to so improve the habits of the men under our employ that they and their households shall call us benefactors.

So that while we are discussing matters pertaining to the maintenance of a perfect road-bed and track, I hope we will not entirely ignore measures that refer to the improvement of the condition of those under our charge. Then, while striving to secure the approval of our employers, on the one hand, we shall also meet the approval of the employed, on the other.

In conclusion, permit me to thank you for the favor enjoyed as President of this Association, and for your kindness shown me while occupying this position.

You will soon place some other member in the Chair to govern your affairs for the coming year, and I hope he will receive the hearty support of all, and that each day the interests in the Association will grow, until it becomes one of the first Associations of our country. (Applause.)

Mr. Charles Latimer, Civil Engineer of the N. Y., P. & O. Railway, being present, was called upon, and addressed the Convention, as follows:

VITAL THINGS.

What are we to call vital things upon a railroad, in the line of our duty? Let us seek them, and find them, for if we occupy our time upon generalities, platitudes, settled questions, self-evident propositions, we accomplish nothing.

First, then, we must have a good, solid foundation for our road; otherwise, we cannot keep it up.

Second. We must have it well settled and good base, or our ballast will not stay upon it.

Next, we must have good, strong, well-seasoned oak ties, of proper proportion, upon which to lay our track.

Next, we must have a steel rail, of proper weight, proportion and quality, good spike, well tested, proper shape, size, weight and material, and then a joint with which the rail must be fastened.

Then they must be carefully laid and ballasted. Now, suppose the road-bed perfect—ballast, ties, rails, spikes, joints and everything as it should be—the road-bed be not ditched, the ties be not spaced properly, the spiking badly done, the rails laid without regard to expansion, and the gauging erroneously done, the track be not shaped as the rails are laid, the locomotive run over the new track, rails of the most costly kind bent and kinked—we have failed in vital things, which is utterly inexcusable; and yet how often do you see such work?

Now, when the track is laid, and the question comes as to the selection of frogs and switches, and let us suppose all have been properly selected, but when they are laid in the proper position the leads and curves are all wrong, and accidents result, we have neglected the vital points, and thus, from ignorance and neglect, death and destruction ensue, and the culprit is rarely known. But outside of all this, suppose the rails are too light for the traffic, of inferior material and quality, improperly drilled, with splices misfit, bolts too short, frogs and switches of wrong size and pattern; here comes in another class of vital things neglected, all of which we have all seen.

The doctrine of the survival of the fittest is probably nowhere so completely carried out than upon a railroad; but then man has brought forth many inventions and tried many experiments, and some come to power without the experience to judge, frequently setting back the wheels of progress some years upon roads.

As an example, I know of a road where, on account of an accident at a split switch, the manager decided that every one should be at once removed upon the long line of road, and another kind introduced, which was done; but the law of the survival of the fittest came in, and four years passed, and the split switch was restored at an immense cost, of course.

And again, an accident at a spring-frog caused a manager, in alarm, of his own sole decision, without proper consideration, to abandon all spring frogs and substituting rigid frogs at an immense cost, of course. Now these two things are material things, and the vital ones upon a road, viz:

1st. What is the best switch?

2d. What is the best frog?

They are certainly most vital questions, and upon them must and do hang the lives and property of many people. But not only is the question vital as to the best kind of pattern, but the best construction of that kind and pattern.

Now, without hesitation, after the most careful examination and experience of years, I say that a spring-rail frog, well made, is safer and four times as economical, at the least, of any frog known.

3d. That a split switch, properly made, is the cheapest, safest and most durable of all switches.

These are vital things and of great economy, and as yet unsettled in the minds of many. I will mention one other of the material vital things. We all know that in the years of our experience many lives have been lost by switchmen and others getting their feet caught in guard rails, switches, frogs, etc. This has become a vital question; how shall we prevent this loss of life? Several years ago we tried cinder and wood, and after long thought upon the matter, pro and con, I know nothing better than wood.

This is a vital thing and should never be lost sight of until the perfect remedy is found.

But what are the vital material things to those things which underlie and surround and crown the whole?

What can we do without strong, muscular arms, good physique, good health, good common sense, and heart devoted to the work we have in hand?

We all agree in this, and who will dissent? And yet to-day the roads are pursuing a course which is dwarfing the race, weakening it, body and soul. I mean this, that outside of any question of religion, that the race will be stronger and more intelligent which obeys the law of God. Instead of this, we work seven days in the week, and in every day more hours than is proper. Can the future generations of the country be as strong as they should be, under such circumstances? In the running of trains throughout the country, no regard is paid to the Lord's day, upon railroads, until railroad employes have relapsed into a sort of Egyptian bondage, and they dare not, or because they reap profit from it they cannot, speak against this evil. And so, here and there, families on these Sundays are without the care of their fathers.

Certainly the children of railroad men worked thus must be dwarfed. In addition to this, the law broken leads to intemperance, and thus Sabbath-breaking and intemperance go hand in hand by authority to break down everything held dear by our forefathers, and all that distinguishes us above other nations.

Many of you will wait for a Sunday to put in a crossing. This is entirely unnecessary and wrong. In any case, get everything ready and put them in on a week day; it can be done much better then.

The greatest evil I see to-day on railroads, and the most vital thing to correct, is Sabbath-breaking and intemperance.

But yet, withal, there is another more vital thing than all. It is humanity. What can any railroad company expect which treats its employes like machines? We need the most intelligent labor, the most intellectual labor, and the most loving labor we can get.

Let me have the hearts of my men with me, and let my competitors care nothing for their hearts, and only what their brawny arm can do by an uninterested service, and I will carry the majority of the freight and passengers, and have a better road on less money. (Applause.)

Mr. James Sloan—I move that hereafter, in the discussion of the questions to come before us, that no member be allowed to speak more than five minutes.

Carried.

Mr. Mills, Southern Central—In our country, the split switch—and especially the Lorenz switch—are used. They seem to take precedence over everything else. We have been using the Brahn frog. It has given very good satisfaction. It has been in use for eleven years, and has never been taken out for repairs. But it seems the rigid rail frog has given still better satisfaction. The Wharton switch is liked by all railroad men, but it is too expensive for general use. The companies can't use it.

The President—Have you examined the frog on exhibit at the hotel, Ajax Forge Company's make?

Mr. Mills—Yes, sir; and I think it a first-class frog. May I ask the President's opinion of it?

Mr. Burnett—I haven't examined the frog closely, yet what I have seen of it, I will say this: If the bolts are properly protected, I see no reason why it should not do its work. The Rock Island are using the Morden frog, yet they are susceptible to improvements, and may give this frog a trial.

Mr. Preston, Rock Island—Having tried nearly every frog manufactured, we have abandoned everything else but the rigid steel rail frog made by Morden. The angle used on our main line generally is one in ten.

The Chair—Why did the Rock Island road abandon the spring frog?

Mr. Preston—By reason of faulty construction. I have made up my mind that the "Clarke-Jeffery" split switch is the most economical switch that I have had any experience with. And so far as frogs are concerned, I must say that I am largely in favor of the rigid frog on a plate.

The Chair—In putting in frogs, do you widen or narrow the gauge?

Mr. Preston—It is a very rare thing to find a frog in perfect line, and in putting in a frog you have generally to use your own judgment in regard to it. In putting in a frog it should be left at an easy gauge, more particularly at the point. The line, of course, has something to do with it. I never could make myself believe that an absolute or positive rule could be adopted. What

I mean by an easy gauge would be from one-sixteenth to one-eighth of an inch in the frog. You might possibly spread to three fourths of an inch on a curvature. Possibly, in talking about an easy gauge, you might go as far as one-fourth of an inch.

The Chair—What distance do you set your guard rail?

Mr. Preston—Two inches. Leave two inches in the clear. When we throw to the frog, we intend to have two inches.

The Chair—Suppose you have a two-inch flange way, and your wheel is gauged so that it is a half inch narrower, what effect does that have on the frog and switch?

Mr. Preston—The result would be to make the wheel bind against the wing of the frog. It could not be otherwise, as I understand it, but in all cases you have got to set your guard rail off some distance.

Mr. Houghton, W., St. L. & P.—We use mostly the Elliot rail frog. The cast frog is entirely done away with. We are about commencing the use of the spring frog; the Missouri Pacific pattern. I am not in favor of that frog, mainly for the reason that there is not support enough at the point. The Missouri Pacific pattern frog is one side rigid and the other lax. They are nine feet long. One in nine.

I think the matter of gauging the wheels wrong does more injury to the frog than any other one thing. If wheels were made of a uniform thickness of flange, and they were put on the axles gauged from flange to flange, instead of gauging on the wear side of the flange [as they do, we could put our guard rails exactly to the point.

The Chair—I see in the questions issued by the Car Builders' Association, this question is asked: " Do you either widen or narrow the gauge opposite the point of the frog?" Do you make any difference?

Mr. Houghton—No, I do not.

The Chair—What shape rails do you use?

Mr. Houghton—Fish plate patterns, 59 lbs., we have been using. We now use 63-lb. rails.

Mr. Callahan, C., M. & St. P.—We use a rigid frog, made at our own shops, riveted to a plate of boiler iron about three-quarters of an inch thick. We were greatly troubled by loosening of rivets, which I attribute to the gauge of wheels of cars, and on account of the tires of engines not being turned at the proper time. Master mechanics are apt to be neglectful in not having the tires of the engine turned when it is needed, and the curve of the wheel becomes too great. I think that is the principal cause of the breaking of bolts. We use a guard rail upon the inside of the frog. Our crossings are nearly all at right angles. We never use the spring frog. We use the Whittemore switch-stand, which works with a gear, that swings it half way round. Our switches are stub switches. We use no split switches at all, only in a few cases where manufacturers have put in sample switches. We have discarded the use of the spring frog on our line.

Mr. Adamson, O. & M.—We use the stringent frog and stationary frog. We are not using the spring frog. We have some of the Elliot frogs and Wier frogs. I recommend the Elliot frog from the experience I have had. I would prefer the spring frog, if properly made. We do not use the Wharton switch. I have seen them in use on the Big Four road, and approve of their use.

Mr. Tompkins, C., H. & D.—I like the spring frog best. We get our frogs from Fred. Wier & Co., Cincinnati. I consider them safe under all circumstances, if properly taken care of. We use the split switch. I consider the Wharton switch a very good switch, but very expensive.

The Chair—Do you consider the spring rail frog as available for all places as the rigid frog?

Mr. Tompkins—There are places where they object to it. Where two tracks come into one, both of them a main line.

The Chair—If you were putting in a switch on a three, four or five degree curve, would you consider a spring frog on the outside of that curve would be equally as safe as a rigid frog, provided you kept your guard rail in proper shape?

Mr. Tompkins—No, sir; not on a strong curve. There would then be a very heavy pressure upon the spring.

The Chair—Do you consider the split switch as safe under all circumstances as the stub switch?

Mr. Tompkins—Yes.

The Chair—Do you use any spring with your split switch?

Mr. Tompkins—No. The split switch of course needs attention in the winter time on account of snow, but the stub switch needs attention in the summer time on account of expansion and contraction.

Mr. Coleman, A., T. & S. F.—Mr. President, the switch stands and head chairs used by our company are those made by the Standard Switch Co., of Topeka, Kansas. These switch stands are the best I have seen for stub switch work, as with the boltless connections all lost motion is overcome, and last twice as long. This company also make a wrought iron head chair that does fully overcome the trouble of breakages and so much tamping up of head blocks. In some cases I have saved one-half in section labor in keeping up very hard worked or heavy traffic switches. We have used these goods for three years, and I must allow candidly that I have never used or seen used any device of switch stands for stub switch purposes that will compare with them. We have never had an accident with them by reason of broken rods or chairs, as was continually the case when cast iron head chairs and other connecting rods were used.

The President—Have you examined the frog on exhibition at the hotel, manufactured by the Ajax Forge Company of Chicago?

Mr. Coleman—Yes, sir; and think it a very good frog; in my opinion it's the strongest frog I have ever seen.

Mr. Lovell—In connection with this question of switches, it seems to me that the aim of this and these Conventions of Roadmasters should be to arrive at some uniformity in track practice, and particularly in track material. We should be here not to recommend any particular manufacture, the natural tendency being to recommend that particular manufacturer with whose articles we are most familiar, but to endeavor to bring to some degree of uniformity the different track appliances and material with which we have to do, so that a frog or switch made in Maine could without any difficulty or change whatever replace one made in California. Track material varies more than many of us have any idea. Frogs vary in length from six to fifteen feet, and differ in distance from point to toe or heel, as they differ in numbers, there being no uniformity except in the name. Switches are twelve, fifteen, eighteen and twenty-four feet long. Some have a rigid rod, others have springs; some are planed much, others little; and the "throw" varies from three to five inches. It may take several years to do it, but I think that this Association should aim to submit to railroad management in general, as well as tc manufacturers of railroad material, something definite in thes particulars.

The Chair—What throw do you make your split switches?

Mr. Lovell—Three and one-half inches. With the spring w use the ordinary ground lever, which has a five and three-quarte inch throw, and which can be adapted to the throw whether it b three or four inches, by adjusting the nuts on the rod, an make the points fit up tight against the main track rail.

The Chair—What distance do you use from the point of th switch to the point of the frog—a one in ten frog for instance

Mr. Lovell—Our standards are gotten up on the principle tha the proper distance from the point of switch (split switch) t point of frog is the length of the theoretical curve between thos points, which for a No. 10 frog would be ninety-five feet; bu from practice I do not agree with this, and have formulated rule for obtaining this distance, which in practice is, I think, bette than that obtained from theory.

Mr. Doyle—We gauge our frog up close gauge. We do no gauge it at the point. If you gauge the frog up tight at the to of the point it would be too tight: so we move back two and half or three inches and gauge the frog tight there, and then g to the heel of the frog and gauge it up, and then toe the fro and so run through. The frog would be perfect gauge 'thre inches back from the point. My theory is, if you set the fro wide gauge and the wheels happen to press in on the journal tig it would either pull your guard rail off or break your rivets. An I think that generally does break the rivets. There is no dout the wheel breaks the rivets by putting the frog wide gauge. think the frog ought to be set up so that the gauge sets dow tight in it. Then set your guard rail up an inch and three-qua ters and the same distance between your guard rail and wing rai We use the Morden rigid frog. We have some spring frogs o the branches. We do not use split switches. We are going t use the "Clarke-Jeffery" switch?

The Chair—In a one in ten frog what is the length to switch

Mr. Doyle—Sixty-six feet. We are not using very many one i ten frogs. We are using one in eight. The spring frog is m favorite laid on a plate, so that they get a good bearing for the rail. We intend to adopt the split switch.

Mr. Craig—We have used the Brown frog for about seven years and find it a very good frog in every particular. Have never had as much trouble with frogs as with crossings. I have heard gentlemen remark about rivets breaking. Do they break or shear off? There is some cause for the rivet not performing the service for which it is intended. I am of the opinion they are sheared off. My experience is that a rail riveted on boiler plate is very incomplete. It is very expensive and I do not consider it safe. Never used any spring frogs on our road. We use the Wharton switch altogether. I think they perform better service than the split switch, and do not wear out.

The Chair—What ballast do you use?

Mr. Craig—Sand and clay.

Mr. Sloan—What do you think of the frog at the hotel, manufactured by the Ajax Forge Company of Chicago?

Mr. Craig—I have examined that frog with care and think it a common sense frog, one that will prove strong and durable.

Mr. Solon—I am in favor of gauging up tight at the frogs, and having a true line well ballasted, well tamped, even, uniform surface and line. That is everything in connection with a track I claim this, that a man to be a roadmaster or a good trackman must commence at the spike maul. [Applause.]

Mr. Jones, C., B. & Q.—We use the spring rail frog of our own manufacture. One peculiarity about our spring rail frog is at the angle of an ordinary spring rail frog. Ours is a curve where the throat commences, so that it fits up against the point better than any spring rail frog I ever saw; and I am entirely in favor of split switches and spring rail frog. We use a 13½-ft. point; making 67½ feet from the point of the frog to the heel; making 81 feet from the point of the frog to the switch point, with an angle of one to eleven. The throw of the point is 3½ inches.

Mr. Latimer—What lead?

Mr. Jones—Eighty-one feet from the point of the frog to the end of the switch points.

Mr. Crippen, C., R. I. & P.—I am in favor of the spring rail frog if properly made. I do not like the Morden frog. The Rock Island use the split switch, which I think is a very nice thing. We use the "Clarke-Jeffery" switch. In a one in ten frog, we give 79 feet lead from point to point. Our throw, I believe, is 5 inches. We use a 10 ft. Morden frog. We use 15 ft. points and 30 ft. rail.

Mr. Nolan, Cincinnati Southern—Our standard frog is the Elliot one in nine. I consider the Elliot frog, as a matter of economy, the cheapest and best frog in use. After the wing rails are worn they can easily be replaced with damaged rails at a very little cost. After the second set of wing rails are worn we usually put in a point rail, at a cost of about $5.50.

The Chair—With a perfect wheel, as we ought to have, under a car, will the wing rail adjoining the point, in any case, become depressed or laminated to any extent beyond the point? Will not the point, in other words, follow with the wing rail?

Mr. Nolan—Not to the extent that the wing rail does. Where the greatest wear comes on the wing rail is from the point of the frog to the toe, right at the theoretical point, where it ought to be. It occurs through defect of double-flange wheels. Fifty-three pound wing rails wear out after about two and a half years' service.

The Chair—Do you use any spring frogs?

Mr. Nolan—Yes; we used eighteen-feet spring-rail frogs formerly, but we found them objectionable on account of double-flanged wheels, running from the frog, would scrape the points and force the wing out and drop down. We had two or three derailments from that cause. I consider riveting the frog to a plate very objectionable; it interferes with the flange of the rail, and that should not be done with a steel rail. We use one in nine. The lead is seventy-nine and a half feet from the point to the split; fifteen-feet split.

Mr. Lovell—Why do you have seventy-nine and a half feet as the distance for a number nine frog in the lead?

Mr. Nolan—I would prefer to let some other gentleman answer that.

Mr. Latimer—You said that your lead was seventy-nine and a half feet?

Mr. Nolan—Yes.

Mr. Latimer—Do you mean from the head-block or from the point?

Mr. Nolan—From the point. Our road is a five-foot gauge.

Mr. White, C. & A.—We are adopting the Wharton switch; have been using the split switch for some time, and have taken them out. On a single track, where trains run against the points, we have experienced some accidents; on the double tracks, where we run with the points, we leave the split switch in. We use the Elliot and Morden frogs; we used to use the spring frogs, but have done away with them. I think poor construction was the cause of the abandonment of the swing frogs. We made them ourselves. I think the accidents occurring while using the split switch resulted from the negligence of the section men in not keeping them tightened up to the proper place. We also had a good many engines on the road, the tires of which were not properly cared for, and that used to cause the bending and spreading of the rails.

The Chair—What lead did you give in your split switch, from the point of the frog to the point of the switch?

Mr. White—Sixty-five feet.

The Chair—And what was the angle of the frog?

Mr. White—One to nine.

The Chair—What gauge?

Mr. White—Four feet eight and one-half inches.

The Chair—In putting in your frogs, did you retain the gauge proper to the rail?

Mr. White—Left about one-fourth wide.

The Chair—Why do you do that on a straight line?

Mr. White—On a straight line it is not generally done. We lay a loose gauge on a straight line.

The Chair—Do you believe that is the proper thing to do?

Mr. White—We never saw any injury result from it.

The Chair—As to your wing rails that run out on the frogs, do you observe whether the rivets in those break more than the track proper?

Mr. White—No, I think not. We generally lay the guard rail about two and one-fourth inches out, with a loose gauge.

The Chair—If you could have the frog made to suit, would you prefer a rigid frog to a spring frog, everything else being equal?

Mr. White—Yes; I have not had much experience with spring frogs. For the last fifteen years we have been using rigid frogs exclusively. I think the Wharton switch is the best and safest switch made. There is nothing about the Wharton switch that a badly worn wheel can interfere with.

The Chair—How much is the elevation in the wing rail in your switches?

Mr. White—About two inches at the highest point.

Mr. McQuiston—My experience has been very largely with the stub switch. Had ten years' experience with the Wharton switch. They gave very good satisfaction, and in my opinion, in the long run, they are the cheapest and best switches I have any knowledge of. We tried split switches with the same results described by the gentleman who last spoke. They caused accidents and were abandoned. My experience with them is quite limited. We have never had any difficulty with the Wharton switch. We have safety irons in addition to the switch, to keep from going off the track. If the track crawls they crawl a little with it. We elevate one and three-quarters to one and seven-eighths inches. When the main rail wears down the elevation becomes too great sometimes.

We have tried almost every kind of frog—all kinds of patterns—and finally got on the Elastic—a cast steel frog, laid in a cast iron plate with a piece of wood between. We had some trouble with the spring frogs. For several years we have been using a close frog. It has a wrought iron plate with a block. The whole thing is spiked down. The rails are interchangeable. If the rail wears off on the work side at one end, you can take that one and put it on the switch side, and it will work on a pinch. We have found, where the track is not in perfect order, that those frogs can wiggle around a little more, and we have less trouble, and there are no bolts to tighten. Since we have got to putting in sixty-seven pound rails, we have been getting frogs made by Wier, in Cincinnati, who puts cast iron blocks and bolts through them. They have answered the purpose well. We have 5 feet and 4 feet 8½ inch gauges together; four rails. Each of those frogs is like a crossing. You have to move two rails, and being bolted together they hold remarkably well.

The Chair—Have you examined the frog on exhibition at the hotel, made by the Ajax Forge Company of Chicago?

Mr. McQuiston—No. We have used the Morden and other frogs. They have none of them given entire satisfaction. It is a good deal like getting a perfect joint. We have never quite reached it.

Mr. Lovell—I would like to ask the gentleman what has been his experience with the Wharton switch on the inside of a sharp curve?

Mr. McQuiston—We had but one curve of that character, and the Wharton switch worked successfully there for nine years.

Mr. Lovell—The experience of our company has been that they can't be worked successfully on short curves.

Mr. Coleman—We had three of them on the inside of sharp curves, and we had to take them out. The degree of curves was one 4½, one 6, and one 7. We never made them a success on the inside of a curve. We use a one in nine frog.

Mr. White—We have used the Wharton switch on a 4½ degree curve, and never had any trouble..

Mr. Coleman—We had one in at a point where we run very slow, and we had to take that out.

Mr. John Sloan—We use on our road a one in nine frog. We adopt the split switch in all places where we have a steel rail. We give seventy-five to eighty feet lead.

The Chair—Why do you vary?

Mr. John Sloan—As a general thing we make it seventy-nine feet. Two 30-feet rails to the end of the frog, 79 feet 4 inches, according to the way our frogs are made. The throw is five inches at the point of the split rails. The rail is planed off for the angle of the frog—a one and nine frog. It is four feet eight inches from the point of the rail to where they leave off planing.

The Chair—Why do you give your lead seventy-nine feet?

Mr. John Sloan—It takes two 30-feet rails, and saves any waste in cutting. My preference would be the spring rail frogs. A few years ago they were used generally and were condemned. It was not the fault of the frogs. It was generally the fault of the drive wheels being too hollow. I sat by and saw an engine run off from that very cause.

The Chair—You got an order right away to take the frog out?

Mr. John Sloan—Yes. The engine was at the same time condemned. They claimed if they had had a rigid frog there the accident would not have occurred. That might have been true and might not. The engine was going very slow, probably four to five miles an hour.

Mr. Reed, S. F. & W.—I think I understood the gentleman from the Pennsylvania road to say that he did not believe in the theoretical lead. May I ask him why he comes to that conclusion, and what is his rule?

Mr. Lovell—I should perhaps explain myself, that I may be correctly understood. I am not opposed to theory, but in switch work I have found from experience, that better results can be obtained from varying from the theoretical lead, when advisable, than from blindly adhering to it.

To ascertain what I term the "shortened" lead, which, by the way, almost every practical trackman uses, getting it in his own peculiar way and according to his best judgment, I assume 5½ inches at the heel of the point or split switch as the most advisable distance, gauge to gauge, between the main track rail and switch rail, and considering this 5½ inches the "throw" of a stub switch, and calculating the lead for a stub switch to which is added the length of the switch, which, on the Pennsylvania R. R., is 18 feet.

Varying a little arbitrarily from these calculations, for the sake of aiding the memory, the following rule is made for 4′8½″ and 4′9″ gauges, and though not exactly correct, is better for practical use than the theoretical leads:

Rule.—For all frogs up to and including a No. 7, nine and one-half (9½) times the number of the frog. For a No. 8, nine (9) times the number. For a No. 9 and No. 10, eight and one-half (8½) times the number, and for all above a No. 10 eight (8) times the number of the frog. This applies only to 4′8½″ and 4′9″ gauges.

Some objections naturally arise to the above, but this is not the time nor the place to discuss them. I have in course of preparation a little work upon this subject which meets all the objections. I should say, however, that the Pennsylvania R. R. has adopted 5½ inches as the distance at the heel, and that good results can be obtained from using a 15-foot switch rail with the stub lead.

Mr. Reed—It occurs to me that the theoretical lead is the most perfect lead that can be used. I have always used it on the road with which I am connected.

Mr. Lovell—What kind of switches do you use?

Mr. Reed—All sorts of switches. For our main line perhaps the Wharton switch is the standard.

The Chair—What lead do you give your split switches to your one in ten frog?

Mr. Reed—We don't have a frog of that size. Our frog is a number eight. Our lead from the head of the switch to the point of the frog is 62½ feet, I think. That is on a split or Wharton switch. That is on a five-foot gauge track.

At this point the Convention took a recess until 1:30 P. M.

AFTERNOON SESSION.

The Convention met at 1:30 P. M., President Burnett in the chair.

President Burnett—Gentlemen: The question of frogs and switches has been reasonably well discussed. In that discussion we find a great variation, not only in the leads but in the different methods of putting them in. For instance, in a number ten frog the lead varies from 66 to 95 feet, and it would seem to me that somebody is not right. For myself, I use 79 feet for a "Clarke-Jeffery" switch, and a one in ten frog. The question is often asked: Why do you use it? I say this: Because I get better results from a 79 ft. lead. The first switch I put in I took a theoretical lead of 94 ft. one in ten frog, used 15 ft. points. When completed I found my lead was a very poor one, one that in my judgment could be improved. I then changed it to 85 ft., yet I was not satisfied with it; then I changed to 79 ft., setting head of points 64 ft. from point of frog; at that point I had 5 in. from gauge point of rails, points having 15 ft. gave me 79 ft. and a splendid lead to frog. I then asked our engineer to give me the proper lead for a split switch, 15 ft. points, to a one in ten frog, 4′8½″ gauge, and he gave me 79 feet as the proper lead. Then the Rock Island adopted that as their standard—79 ft. And if anybody has anything better than that we would be too glad to change it. As to spring frogs, we have used a good many kinds of frogs that were made in our own shops. I put in a spring rail frog made of John Brown steel of 1872. I took it out last week. It has laid on our track on a 2:30 curve on the outside. It was made in the fall of 1872, and put in in 1873. The frog, in the meantime, has been taken out twice and taken to the shop and the rigid rail re-riveted to the plate, at a cost of about five dollars. That frog has worn under a tonnage of three or four million tons a year, and the spring rail of the frog is in as good condition to-day as any of the John Brown steel laid then, and that is not saying, by any means, that it is first-class, because the steel is pretty well worn. It has laid twelve years. We had some spring frogs made by Mr. Morden, of Chicago. They were a perfect failure. Only so in the manner of construction. We have some of them in yet of the Morden make. I think the spring rail frog, properly made and cared for, is equally as safe as, and more economical than, any frog I have used.

Mr. Preston—I would ask Mr. Latimer to state to this Convention, in a short way, what is the correct length for a lead on each angle of frog?

Mr. Latimer—Gentlemen, I have a very simple rule upon that, and one I think you can carry in your minds all the time from this time forward, if you will just take it down: "Twice the gauge of the track multiplied by the proportion of frog, will give you the lead." Illustration—Take a one to nine frog, five foot gauge: $2 \times 5 = 10 \times 9 = 90$.

Mr. Doyle—I move that the further discussion of the question of Frogs and Switches be laid over until our next meeting.

Carried.

The Chair—Gentlemen, as yet you have not disposed of the invitation of Mr. Sherwood, Superintendent C., I., St. L. & C. Railway.

On motion of Mr. Coleman, A., T. & S. F. Railway, the invitation was accepted, and that the Association would advise Mr. Sherwood of the hour of starting.

Life-Saving Appliances, Especially Foot-Guards for Frogs and Switches.

The question of life-saving appliances, especially foot-guards for frogs and switches, was taken up, and discussed as follows:

Mr. Doyle—We use the Hart foot-guard; have used it two years; it is the best I ever saw; costs $1.75, including everything. Where frogs are used to run in lumber yards, that are not going to stay long, we put in plank. We have never had an accident; once we blocked it; before that we had a brakeman killed by getting his foot caught in the frog while coupling on an engine.

The Chair—Did you ever try filling your guard-rails with cinders, or anything of that kind?

Mr. Doyle—Yes; I tried one switch that way, but I don't like it so well as I do the Hart foot-guard; when you fill in almost up to the rail it is hard to clean out.

Mr. Jones, C., B. & Q.—Mr. President: The C., B. & Q. use a foot-guard sawed out of an oak plank, and it works very successfully; it does not cost over fifty cents to the switch to saw them out and bolt them down; we saw them off so the flange of the wheel don't touch them.

The Chair—Do you think they are an absolutely safe foot-guard?

Mr. Jones—We have thought so; we have never had any trainmen get caught.

The Chair—At what point of the rail does your plank cease?

Mr. Jones—About even with the lower part of the ball, so there is no room for the foot to get in, to get caught. I have tried to fasten my foot in it, and I could not do it; and I have a pretty good-sized foot, too.

Mr. Merrill, L. S. & M. S.—On the question of cinders for foot-guards, I have used them for a number of years, tamped between the lead rail, and at the heel of the frog, and at the end of the inner rail, tamped with a tamping-bar or shovel; it would make a very good guard; it requires close attention; never used any wood.

Mr. Adamson, O. & M.—In regard to protection of life from frog and guard-rails, since our discussion at St. Paul and Chicago, we have adopted a filling, with two or two and a quarter inch plank, in the frog and guard-rails likewise, at a small cost, got from scraps in the car shops. It costs twenty-five cents a frog, guard-rail included. We find it serves a very good purpose. All companies have those scraps handy, and any of our trackmen can do it.

Mr. Preston—Having used various foot-guards, I have adopted the Hart foot-guard, or Hart's blocking, rather, as the sole foot-guard on the Iowa Division of the Rock Island road. Have used it two and a half to three years. We have at this time the entire main line blocked with it. It costs us, for a switch complete, a little less than two dollars. For a three-way switch it will cost about three dollars. I think the Hart foot-guard is the best, cheapest and most economical block there is now in use; that is, that I have had any experience with. There may be others better and cheaper, but I have not seen them. Since using that guard we have not had an accident in the way of a man getting his foot caught in the frog. Whether that is on account of the blocking or not, I cannot say, but I think it is.

Mr. Coleman—We have been using a three-inch plank, fitted to the frogs and guard-rails, and the lead-rails as well, sawed so as to fit; been using both oak and pine. In a few instances we have had parties caught.

Last spring Mr. Hart came there and gave us a sample—filled a couple of frogs, and we have tested them in our yards, and we have found, by experience, men can't get their feet caught very well, and we consider them the cheapest and best block we have found. We fill up the toe to the point of the curve of the guard rail and all in through our leads to points of frogs, and any points where a man is liable to get his foot caught, and in some cases, with that done, we have had men caught and crippled.

Mr. Jones—I have seen a steel spring foot-guard in use on the Michigan Central.

The President—The Rock Island has adopted the Hart foot-guard, and so far as I know it has given entire satisfaction; yet if there is a better one I would like to see it, for I do believe that if there is any one thing upon a railroad that demands attention of the management of railroads, it is the protection of the men that do the work over the frogs and switches; and so far as the price is concerned it cuts no figure. The life of one man is worth more than any system or style of foot-guard.

Mr. Latimer—I mentioned this morning that we had used cinders and also blocks. We used that steel spring that has been mentioned. That was the invention of Huntington, the author of "Roadmaster's Assistant." I put them in and they were condemned by the Roadmasters as not stable enough. They soon got knocked to pieces. Possibly some modification of that spring might do. However, at the discussion at our last meeting, we all favored wood, except one, who favored castings, and the models were made for castings, for light castings, to be put in. I have not figured up what it is to cost, but I think it would be very considerable. I did ascertain that one set of castings were made, but the general impression seems to be, except in the mind of one Roadmaster, that it is going to be too costly for the purpose. Now, when you come to the question of wood, as some one suggested awhile ago that cinders would not do, especially in the winter, you get picking in there and pick it out. Now, how about wood? You pay $1.75 to a switch to put it in, and you get ice in there. Why won't you pick any wood all to pieces? Therefore, it comes to this question: What is the cheapest device you can put in, and have them always ready? It is very plain from what has already been said here, that a cheap wood block can be made, costing probably 50 cents. Of course you will see that I am not speaking in the interest of anybody. I am speaking very plainly. I am a sympathizer with all inventors. I never failed to look at an invention exhibited to me in all my life. I always feel sorry for them when they come, and I never speak disparagingly of any when I can help it.

As to this guard on exhibition here, will that prevent the foot from getting caught? If so, the inventor can put those in cheaper and better than anybody else. He can manufacture them in the proper way and put them in 25 per cent. cheaper than the road can do it. The question is, does this overcome the difficulty?

Then another question comes up: After you have filled up all the switches and frogs and guard rails, and everything where a man's foot is liable to be caught, havn't you multiplied places where, in times of snow and ice, you are going to get off the track? You go and fill in the very places where you don't want to fill in. There is a vital question, too. Are you going to make a number of traps all over the road to guard men's lives, when you might by those means kill a thousand others at one blow? Is not that likely to occur? I would like to know if it is not. You fill all your switches, and then have a tremendous sleet, which fills up the ends; or, a snow falls, and it partially melts and leaves ice there, and along comes a train, and off it goes from the track, and more people are killed there than would be killed the other way in a hundred years. When the question was agitated in Michigan, and they were going for the Michigan Central, the manager asked me what I thought of the question, and I was puzzled to answer. It is a mooted question. It is not positively settled in my mind, except we had better use some plain, cheap device—cinders, probably—or plain wood, until we know what we are about. If you are all satisfied there is no danger in filling all the frogs on the whole line with wood, with the accumulations of ice and snow on top of it, why then vote that is the proper thing to do; but you may possibly jump from the frying pan into the fire.

The Chair—Do I understand you to make the claim that this Hart guard is an impediment, or collects snow and ice? This Hart guard that was here; or is it the plank you refer to?

Mr. Latimer—I don't see as much objection in the Hart foot-guard as in the plank. The plank naturally would fill up more than this. This, however does fill up, though it is the neatest and most complete arrangement for the purposes intended I have seen. Whether we are satisfied it is *the* thing—I would not like to see the Convention declare it was the thing without a good experiment.

The President—As I said before, it is the cheapest, best and most economical foot-guard we have got hold of so far. I have seen nothing better. I might find a little fault with it, I presume.

Mr. Latimer—The point I raise against it is, that a person going backward might be liable to catch his foot in it; and the matter of picking to pieces in picking out ice and snow.

Mr. Doyle—It is not necessary to fill the whole frog. We fill just enough to prevent a man getting his foot in.

Mr. Jones—Where we put in our guards we put in salt in the winter time, and we have no trouble with ice.

The President—I would ask Mr. Latimer if he would not consider the Hart guard, as it now is, safer from accumulations of ice and snow than either the block spoken of, or dirt, or cinders?

Mr. Latimer—Yes, I would.

The President—Do you know of anything you would prefer to the Hart foot-guard?

Mr. Latimer—It seems to me a complete thing with the exceptions I have mentioned, and that is a matter for trial. I am slow, of course, to adopt a new invention of so radical a nature as that to put all over a road, with the expense attending it, unless I know I am right.

The Chair—I will say, last winter all my switches and frogs were filled with the Hart foot-guard, and we had no trouble with ice and snow.

Mr. Doyle—I have had two years' experience with the Hart foot-guard, and have had no trouble with ice and snow; and we do not pick it to pieces.

Mr. Solon—I have been studying over these frog and switch guards for the last two years, and feel a great deal as Mr. Latimer does. I have not seen one yet that suited me. I have tried to make one of sheet-iron one-sixteenth of an inch thick. It can be made stronger, if necessary—made to fit the lower edge of the rail, making it concave between the lower edge of the ball of the rail. You can shove them in; you can also have an apron on the outside, which you can draw down on a level with the tie and put a spike in. I have used two of them for two years; they are not solid, and any snow or ice getting under the flange can be easily removed. It will give under a pressure, and still not effect the fitting to the rail. There never was any patent on it, but I would say that if that thing was brought before the public so that they could see it, I think it would be regarded as far better than anything I have seen.

Mr. Latimer—We have some of them. Huntington's son sent me some of them.

The Chair—Unless somebody has something further to say on the subject, I would like to see the question disposed of.

Mr. Doyle—I move that this Convention recommend the use of the Hart foot-guard, it being, as developed by the discussion, preferable to any other foot-guard known or in use at the present time.

Motion lost.

Mr. McQuiston—I move that the question of foot-guards be laid over until our next regular meeting, and that a committee of three be appointed to report at that meeting such points as they may gain in the coming year in regard to the different devices of foot-guards.

Carried.

Thereupon the Chair appointed as such committee: J. C. McQuiston, C., I., St. L. & C.; F. X. Galarneau, L. E. & W.; C. E. Jones, C., B. & Q.

ELEVATION OF CURVES, AND GAUGE OF TRACKS.

The next question for discussion being the elevation of curves and gauge of tracks, Mr. Coleman was called upon by the Chair, and responded as follows:

Our elevation of curves, as a rule, is one-half inch to the degree. Our gauge of track is one-eighth inch to every degree wide.

The Chair—In a five degree curve, what course do you pursue to get your one-eighth of an inch to a degree?

Mr. Coleman—We get one degree of curvature. The stakes are set for all curves on our line showing the degree of curvature. We have what is called a curve gauge; it has a thread, which you let out or take up, as the case may require. It is one-eighth of an inch to every turn.

The Chair—I should be afraid it would be let out sometime and not taken up.

Mr. Coleman—No, it is marked. We have two gauges on each section, and in yards we have enough to meet the requirements of the amount of men we have working. It is made the shape of the Huntington gauge. It is painted, so you can detect one gauge from another. It is set at 4′8½″ always, and when we are through with a curve we set it right back to its 4′8½″ position again.

The Chair—What reason have you for giving five-eighths inch on a five degree curve?

Mr. Coleman—I don't know that I can give any particular reason for going so much out. I can give you a reason for spiking it a little loose, going around curves, so as to give the engines a chance to get around. I have discovered in all curves, especially the class of engines we have, that, in going around where the gauge is the same as it is on a narrow track, they climb the rail, more or less, and it is necessary for us to give her easement of gauge, as we call it. Since we have adopted it we have never had any accident by that class of engines getting off the track; but until that time we did have trouble and difficulty with it, before we commenced to widen the gauge. For instance, for the first degree we give it one-eighth; for the second, one-eighth; and then we add one-sixteenth to that, from that down; that from second to third, one-eighth, and from third to fifth, one-eighth.

The Chair—You say your elevation is one-half inch to a degree?

Mr. Coleman—Yes.

The Chair—At what point do you start the elevation?

Mr. Coleman—Right at the point of the curve; right at the tangent.

The Chair—Do you give it the full elevation there?

Mr. Coleman—Yes; we give it full elevation right at the point, and then run tangent out so as to compare with that track. On anything over a one-degree curve we run it ten feet to a degree out—what we call an easement—ten feet to each degree of curvature.

The Chair—On a six-degree curve your elevation, or depression of the inner rail, would be three inches in sixty feet?

Mr. Coleman—Yes; our Chief Engineer gave us that as a rule to work by, and allowed us a little discretion in the matter. He said he didn't know; that it was a question in his mind as to what the result would be. We start one-eighth of an inch to the degree first three degrees, and then one-eighth after that down to six degrees.

Mr. Lovell—The easement is one degree to every ten feet?

Mr. Coleman—Yes.

Mr. Lovell—What is the greatest curve you have?

Mr. Coleman—That is in our main line, eight-degree. In many places in our yard we have twenty-four-degree curves.

Mr. Lovell—Do you follow out the half-inch?

Mr. Coleman—Not in our yard work. In our yard work we don't use any degrees at all. If it is any level at all, it is one to three inches.

Mr. Lovell—Don't they run pretty rapidly in the yards, too?

Mr. Coleman—Not on those sharp curves; they run very slow. We broke our turn-table at Emporia. We were very anxious to get around there with some engines, and we just built a circular track around the round-house, twenty-three-degree curve, and our engineer instructed us to give it five inches elevation. I told the men who were putting it in not to do it. I asked the engineer if he meant that, and he said he did. I said to the men, "You might give it three inches, not to exceed that"; and I think the nearer level you lay it the better it will be. We started some of our big engines around, and got them off. We then gave 3½ inches. We got the engine on the track, and pulled it back and laid it level, and we went around without any trouble. Now, there is one instance which, if we had carried out our theory, we would have been in bad shape.

Mr. John Sloan—Which side of the curve did it get off from?

Mr. Coleman—The outside.

Mr. John Sloan—If they had had elevation they would not have got off on the outside of the curve?

Mr. Coleman—Why was it, when we lowered our elevation, that we didn't get off then?

Mr. John Sloan—They would not have got off on the outside if there had been elevation enough; they would have got off on the inside.

Mr. Coleman—I can't account for it myself, but that is the way they got off. When we put it down to where I considered it belonged we didn't have any trouble with it. It was the first experience I had had of that kind.

Mr. James Sloan—I have a few curves; I give them one-half inch to a degree; run it back fifty feet, and one inch elevation for the first 200 feet. Then I run down to thirty feet to the degree, until it runs out. I spike all my curves into true gauge. The maximum of our curves are very light.

Mr. John Sloan—Our curves are from one-half to three-quarters of an inch; I think it requires three-quarters of an inch to a degree; we give not less than fifty feet; use half inch on the tangent. We have no curves heavier than six degrees, and we aim to give fifty feet to a degree, and we run out at that. I think half an inch is not enough for curves, where trains are running forty, forty-five to fifty miles an hour. I think you will find they crowd on the outside of the curves and spring, so much so that in the course of time the best steel rail will wear off. At the same time, I think the train runs easier and smoother by giving it a little more elevation. We give not less than three-quarters of an inch. Our curves are all spiked to the standard gauge, 4′9″ We make no allowance for the curve, because I think it takes no more room for a wheel to go around on a curve than on a straight track.

The Chair—Take a twelve-degree curve.

Mr. John Sloan—On a twelve-degree curve a train would not run thirty-five to forty miles an hour. I think I have seen curves as high as twenty. I do not recommend that. I think four to five inches is all the elevation that a curve ought to get.

Mr. Doyle—After you get over a six-degree curve, how much elevation do you get then?

Mr. John Sloan—I never had any except on a Y, or something of that kind. We have had Y's up to eighteen degrees. Four and one-half inches is about the highest elevation we give. A train going slow around a curve don't require as much elevation as a train going fast. I think the elevation given to any curve should depend a great deal upon the speed of the trains to run over them. You have got to have regard for the speed of a passenger train.

Mr. Coleman—I don't want the Association to understand that I think ten feet to a degree is sufficient.

Mr. Callahan—My mode of elevation of curves is more from a practical standpoint than it is from theory. If your curve has too much elevation, your rail will show greater wear on the ball and the cap than it will on the inside. This occurs at such points as your rate of speed is low. And at points where you run at a high rate of speed, and where there is not enough elevation of curve, it will show a greater wear upon the outer rail, on the inside of the outer rail—the cap of the rail. It appears to me the train should be balanced on the curve, as near as can be, judging from the rate of speed your train is usually run at that particular point.

The Chair—What distance do you commence your elevation from the point of the curve?

Mr. Callahan—I think all curves should have an elevation where you strike the point of the curve. It appears to me a curve is as sharp at the tangent point as at any other place in the curve.

The Chair—About what distance do you think it would be that they should start back?

Mr. Callahan—I drop off about an inch every fifty feet.

Mr. Solon—I have always used my own judgment in the matter of curves. After finding the curve on the main line I govern myself by the speed of the train. I commence from 150 to 175 feet from the point of the curve, and when I get to the curve, I have got my elevation. In running forty miles an hour, I raise a six-degree curve three and one-half inches. If the speed were to be a mile a minute, I would put the curve up to four inches, and no higher. I lessen according as the curvature lessens. If I were to have a curve of three degrees, I would raise it not more than an inch and a-half.

The Chair—What method do you use for the tightening of your gauge?

Mr. Solon—Simply observation of trains going around the curves. In going round, if it is tight at the gauge, you will see a joint at the lower side of the curve that cocks in toward the center of the track. I then come to the conclusion that the cause of that is that the gauge is too tight. That is why I adopt the rule of leav- the curve a little wider.

The Chair—You are spiking your track a half-inch wider, for instance, on the curve. Do you have a gauge that you use for that purpose? Do you have a gauge that is a half-inch wider, or do you use the gauge that you use every day, and guess at the difference?

Mr. Solon—We have a mark on the gauge; we use the same gauge, but we note on the gauge. I try to get a uniform gauge. If you don't have that, your train oscillates and twitches.

Mr. Craig—We have curves from four degrees down to forty minutes. We gauge up to the standard, don't allow anything, and our trains go around very comfortably. We gauge the track all the way around.

The Chair—What distance do you take from a tangent, on a straight line, to get your elevation?

Mr. Craig—We go back 100 feet. That is our maximum; twenty-five feet to a degree.

Mr. James Sloan—Do you ever have any trouble with your curves spreading a good deal where you put the gauge tight?

Mr. Craig—Never, except where we use cypress ties; there we find sometimes the gauge opens. It is a very hard matter to maintain a perfect gauge where you use soft wood.

Mr. James Sloan—If you put the inside of your tie down level, so the rail lays level, would it spread then?

Mr. Craig—I think it would.

Mr. James Sloan—Your rail would lay flat, then?

Mr. Craig—Yes.

Mr. James Sloan—Of course as you raise it you get the elevation?

Mr. Craig—Yes.

Mr. James Sloan—Then, if you adzed that down so it would be level, would it spread?

Mr. Craig—I don't know.

Mr. Lovell—We have no fixed rule on our road for elevation of curves, although we generally use one inch to the degree. The elevation is governed by the speed, grade, direction and amount of traffic, and any other governing circumstances, and the amount is determined by the Division Engineer. On a perfectly level curve, I think one inch to a degree up to four degrees, and three-quarters of an inch to a degree above four degrees, until a maximum of six inches is reached, which ought not to be exceeded, unless under extraordinary circumstances, is very good.

The Chair—In regard to spiking your curves, what is your gauge?

Mr. Lovell—There are no instructions in regard to this. Some spike a curve to neat gauge; others leave it a little wide. I am in favor of spiking from one-quarter to one-half inch wide.

The Chair—Would you spike more than one-half inch wide on a nine-degree curve?

Mr. Lovell—No, sir; we don't have a nine-degree curve on the main line.

Mr. Jones—I think it important to have as much uniformity of elevation as possible. I have my trackmen fill their curves up an inch to a degree.

Mr. Reed—In the matter of elevation of curves on the Savannah, Florida & Western road we have no fixed rules by the management; it has been left entirely to the discretion of the masters of roadway, and as I have had to fix the elevation on curves of our road, I have adopted what I have found to be the most generally practiced on railroads. Our gauge is five feet. We have adopted one-half inch to a degree, with a fifty-foot run off on a tangent for each degree of curvature. In my judgment, this is not the most perfect plan railroads might adopt. I think we should consider a spiral, or parabolic, or some form of easement curve, for each end of our circular curves.

The Chair—If you find your curve had not elevation enough, and your outer rail was level from your tangent points, and you have a nice, level track, and you find yourself compelled to increase your elevation, would you recommend to depress the inner rail or raise the outer rail?

Mr. Reed—Well, as far as my individual judgment is concerned in that matter, I would, perhaps, elevate the outer rail one-half and depress the inner rail one-half, keeping a level line in the center of the track.

Mr. Adamson, O. & M.—There is a new work published on the use of the spiral for curves. We commence the elevation where they commence a light curve. We get our full elevation at the tangent now. We elevate one-half inch to every fifty feet, then, instead of compounding by the eye, as our section men have been in the habit of doing, this new work leads to a compound curve, as it comes along imperceptibly. It is an improvement. We have had a few curves laid off on the Ohio & Mississippi, and I am satisfied it is an improvement over anything we have had.

The Chair—Do you hold your gauge on the curve?

Mr. Adamson—Yes; same as a straight line.

Mr. Hanover—I don't think there can much more be said abou curves. Mr. Adamson represents the way we-fix the curve We have some places that we have to make the curv according to the speed of our trains. We run pretty fa

We have some very sharp grades, six degrees at the bottom. We elevate it one inch to a degree always; we never make anything less. In our six-degree curves we elevate six inches, and sometimes they get a little shaky. There is always a cause for that. They get a little flat on the outside, and the cars will spring over—we fix it. You can't keep a curve in shape without work on it. Sometimes this oscillation is caused by the cars being out of shape as well as the track. We have no trouble in keeping our curves in shape by close watching, and we run very fast. We don't pay much attention to freight trains on those sharp grades. If freight trains get stalled they double, although they go as fast as they can, as well as passenger trains. We get our full elevation at the point of the curve. We commence back far enough, and then we ease in the end. If it is a very sharp curve, a six-degree curve, we ease in the end and compound.

The Chair—In the absence of the Roadmaster of the New York, Pennsylvania and Ohio Railroad, I will ask Mr. Latimer to give the method that is used upon the N. Y., P. & O. Ry.

Mr. Latimer—Gentlemen, I don't suppose there is any question in railroading more important than the one you have before you; and you know how some Roadmasters talk, and Engineers too. They say, "Oh, if you had only seen the road when I took hold of it." [Laughter.] One of the Roadmasters whom I lately appointed, came up to one of the meetings and said: "If you had just seen the road when I took hold of it!" Said I, "I know all about it; it is worse now than when you took hold of it." And that was the fact. Now he had forgot precisely the very question up this evening. He was a splendid hand at switches and frogs. There wasn't a man in the country that could beat him on that, but on elevation of curves he failed. Said I, I am going to give you this test level. I had it made. It is an invention of my own. I said, you take that and you go to every curve on the road at once, and test it, and see that it is one-half inch to a degree, and that your gauge is right all through, and uniform. And, said I, I believe that you will have the best division on the road. Well, it is a fact, he did, and he had the best riding curves on the road. I handed that to all the Roadmasters.

Now, I was going to say how I found the road, and it was just as diverse as the opinions are here to-day, and the question of elevation ended. I have not heard any of you advocating giving an inch yet. Most of you say one-half inch. Our rule is one-half inch to the degree. Now, that we may go imperceptibly upon the curve, a full elevation is given at the point of the curve. I know the spiral is not the proper thing, but you can remedy it by running out your elevation to a proper distance.

We take the rule of fifty feet to a degree ; therefore, for three degrees it would be 150 feet. It is probably excessive ; however, it is so imperceptible you don't notice it. Many of these curves are as perfect as they can be with that method. We don't make any difference in the gauge of the road. There is three-fourths of an inch allowed by the cars for the rolling stock of the company. What is the use of having extra gauge on your track when you have already an allowance on the cars, except you have extraordinary curves? I don't know that I can say anything more upon that subject.

The Chair—The matter has been somewhat fully discussed. It is now ten minutes to five. I have been informed by the landlord of the hotel, that certain gentlemen who have a wrecking frog will have an engine off the track, and that they will have carriages at the hotel to convey members of this Association to the place in a body, that they may witness the workings of this wrecking frog. You are all cordially invited.

On motion of Mr. Doyle, the invitation was accepted, and a recess was taken until seven o'clock P. M.

EVENING SESSION.

The Convention met at seven o'clock P. M., President Burnett in the Chair.

The Chair—Will the Secretary please read the communication I placed in his hands?

The Secretary read as follows:

> MR. BURNETT AND FRIENDS—I must return to-night to Cleveland. I have enjoyed meeting with you very much, and trust you will have a very prosperous trip, as you have a valuable meeting. You are a good, strong, earnest business body, and your Association should be extended in influence and increased in membership. I shall be very glad to do all in my power to aid you. Yours truly,
>
> CHARLES LATIMER.

Mr. Coleman, A. T. & S. F.—Mr. President, as no disposition has been made of the question of elevating curves, I move you it be carried over to our next meeting.

Motion seconded by John Sloan of the I., B. & W.

Carried.

The Effect of Unevenly Gauged Wheels and Worn Wheels Upon the Rails, Frogs and Switches—The Best Form and Weight of Rails for Present Rolling Stock.

This being the next question in order for discussion, the Chairman said—Sixteen years ago if cars were loaded with over ten tons they would not haul them. To-day we haul 40,000-pound cars, and they run twenty-five miles an hour. When they were hauling ten tons in a car they had sixty-pound iron rail. We are running engines from forty-five to sixty tons. Engines on passenger trains that are running forty-five to fifty miles an hour, and we still have a sixty-pound rail. It occurs to me, and it must occur to every man present, that a change is necessary. I don't know that a heavier steel would add much to its value, for when you put in a steel rail and have to take it out at the end of two years, because it is being laminated at the ends, I do not know that the weight of the rail would cut much figure, because if it battered at all, it would have to be taken out just the same. The best rails we have, if you examine them closely, have the appearance of a pond of water when moved to a ripple by a slight breeze; the whole length of the rail has that wavy appearance. It is true we are all using more ties to the mile than we did at that time. On the Rock Island we are using 3,200 to 3,300 to the mile; but it seems to me the rail is too light. I know it adds a little to the cost, but supposing that you add ten pounds to a sixty-pound rail, or what it would require to make a four and one-fourth a four and one-half rail. One of our four and one-fourth rails is supposed to wear three-fourths of an inch on the surface and still be a fair rail—a half an inch, anyway. When that amount is worn off from the rail, the rail becomes unsafe for heavy traffic. It is used upon sidings or upon branches. But when that amount is worn off the rail, it is practically worthless, and sold at a nominal price. Now, if adding ten pounds to the rail would add a quarter of an inch to the surface for wear, and it takes from five to nine years to wear out the rail (for in that case you use all of that quarter of an inch), it seems to me there would be a great saving effected.

Now, worn wheels are undoubtedly the worst thing we have to contend with. I don't know of anything that is worse. If a company is using a strong frog the worn wheel is almost death to it. The very engines that should have good wheels do not have them. Our switch engines in the yard are the very ones that break, destroy and ruin our frogs. Now, in the past year I have taken a great deal of pains to measure the wheels of cars. I find they vary from four feet four and one-half inches to four feet five and three-quarter inches; and as high as seven-eighths, that is between the inside of the flanges of the wheel. Now, what man can put in switches and frogs, and keep them in shape, with that kind of a wheel passing over them? You put in a frog to-day; the line is perfect; everything is nice, and you look to-morrow and everything is out of shape. What has done it? It is but a short time ago we had a train of fourteen cars come into Joliet. The frog and switch were all right, but there was a narrow gauge wheel, and it took the guard rail out and five cars were derailed. I was informed in the morning that the guard rail turned over. The ties in that switch had been put in last fall. There were two good iron braces against the guard rail. The ties were oak, eight by ten, under the frog. But, as a matter of course, the track was all in fault. It wasn't the car; they are always regarded as perfect. I don't know that I ever had a wreck but what it was laid to the track, unless it was a broken wheel or a broken journal, and then it was the track, I presume, that caused the break. Judging from my experience, should I ever own a railroad (I guess I will not), I would not use less than a seventy pound rail, and if I owned all the railroads, I would have every rail just alike; one pattern of rail for all the roads in the country, and one pattern of wheel; and the gauge should never vary to exceed a half an inch, with a uniform maximum gauge of the wheel. It can just as well be done. But, they say, "we gauge our wheels *about* four feet five and one-quarter inches." That means anywhere between four feet five inches and four feet six inches. I find more foreign cars, line cars, badly gauged than our own.

One pattern of wheel and one pattern of rail for all the trunk lines would be, in my opinion, a great saving to the corporations, and in that case we would suffer less fault-finding because of the bad condition of our switches and frogs. If the Roadmaster believes and thinks he ought to have heavier steel, he ought to say so, for if he don't know, who does?

Mr. McQuiston—I use sixty-seven pounds steel rail. The best resnlts have been obtained from four and a half inch in height, Pennsylvania iron. It seems to be the opinion of practical men that engines should not weigh over forty-five tons. The additional weight to the rail should be in the ball, or top; we find it easier to keep a good surface on a rail of that pattern; we have had some rails from Joliet, and some from Cleveland, and a great many from Pennsylvania, called the Edgar Thompson, a sixty-seven pound rail of the pattern of which I am speaking. The Pennsylvania iron is considered about the best, taking all things into consideration, but we have not used it long enough; about three years, probably, is as long as we have used it; it is a light rail. We have this trouble about the gauge wheels; we have flat wheels; we don't know any way to remedy it, excepting by widening the gauge; that is objected to. We have one place on the main line that has a thirty-three-degree curve, and the gauge-line is widened an inch and five-eighths. Others put the same degree of curvature along side of us. Ours was laid with old iron.

They took first-class steel and put it in in first-class shape, put it into gauge, and they could not get an engine around it. They finally widened the gauge. If three-fourths of an inch is necessary on a straight line, why is it not necessary on a curve? In Cincinnati, on the "Big Four," we made cross-overs where land was worth a thousand dollars a foot; it was important to make connections with other systems of track. We have there a one in six frog.

The Chair—I will have to call the gentleman to order. He is not speaking to the question.

Mr. McQuiston—I have spoken my sentiments, so far as my experience goes, as to the weight of the steel rail and the height of it.

The Chair—Would you recommend that the railroads would adopt a uniform pattern of steel rails, if it could be done?

Mr. McQuiston—I certainly would, if they could arrive at the right thing.

Mr. Duhrer—I have had a little experience in regard to that matter. Three years ago we had a very cold winter. I worked for the Lake Shore Company. During the month of January we had about seventy-five broken car wheels. Our engineer sent me over the road on a hand-car, complaining our frogs were too wide gauge. I commenced on one end of the division and gauged them all up, and I found them not over an eighth of an inch wide gauge. I came in to make my reports, and the way we found out those car wheels began to be broken, we had three different kinds of steel. One kind, laid in 1865, that was fifty-six pound steel, and only about an inch and a half wide. Another kind, two inches wide and four and a half inches high, and whenever a car struck that narrow rail the wheel would break. In the spring of the year they took out all those narrow steel rails, and we had no more broken wheels.

Mr. Craig—I do not think we can discuss a more important subject than we are now discussing, and my experience has been that a great deal of the trouble with the frogs and switches has not been caused as much by unevenly gauged wheels as it has by worn wheels. The bases, for a five-foot track, for the gauge of a wheel, is four feet eleven and one-quarter inches. That allows three-quarters of an inch play. That is based upon the point of ntact of the wheel with the rail; that is when the rail and neel are new, but when the rail is old and the wheel is new, that heel will be in service one, two or three years, and it wears a alf an inch, what is the result? We then have a play between the rails of an inch and a quarter; our guard rails are gauged; the wheels will pass over. In approaching the frog or switch, if the track should be a little low on one side, the wheel will never un to that side. If it happens to be on the frog side, as soon as he wheel strikes the guard rail, what is the result? The result that the guard rail will bring the wheel over the original cal- lation of where it was to run; the result is the guard rail has receive it, and it has to take the shock. If it happens to be on reverse, the frog has to take it. Suppose we allow that wheel remain in until the play amounts to an inch and three-quarters, at is the result? If your guard rail is bent abruptly the shock very great; it either breaks the wheel or guard rail, and you re a derailment. Before arriving at the frog or switch the eel may run two inches out of the line it was intended to run ; but when it arrives at the frog, it has got to come to the line which it was intended originally, and the elevation of the track l decide that. If it is high on the frog side, the guard rail will eive it; if it is high on the guard rail side, the frog will receive But I think we have had more trouble about that in the past an we will have in the future. As you all know, the Master r Builders' Association have now decided to establish a set of les at junction points, setting forth the wheel and condition of heel to be received at those points, and if the wheel is not in ondition, the next line will not receive it. The result is this: The cars going along on the line at junction points, if not in condition, will not be received, and the responsibility rests with the line having the goods. The establishment of car inspectors at junction points enables us to guard against receiving any such wheels as are not in condition on our line. We don't want to assume the responsibility of our neighbors, because they should have looked into the matter before they received the car. We don't want to send one of our cars off—take the cars in the grain service—your line or mine, they are gone two or three years; you never see them, probably, during that time, and they are like a hired horse, everybody rides him, and when it comes back it has d no care. Everybody wants to get off with just as little ex enditure as possible. Bills are made out and returned. Th aster Car Builders have gone so far as to specify the rates harges. Now, that should be authority. I refer to this to sho he attention that is now being given to the subject of wheels.

The Chair—Don't you find the wheels of your own road ve badly worn?

Mr. Craig—No, sir; we do not. We find the gauge of wheels are perfect; that is, when the cars are first made, and we find the condition of the car to be such that it ought not run, I just simply side track it. I do not allow it to run at There is no Superintendent who would assume the responsibil to order a car to continue in the service if the Roadmaster, examination, found it was unfit for service. It is false econo to keep a car in service that is not in perfect condition. I h had a great deal of trouble with foreign cars, but have very li trouble with our near neighbors.

The Chair—What weight of rails do you use?

Mr. Craig—Fifty pound.

The Chair—What is your tonnage?

Mr. Craig—Our cars are 40,000 pounds capacity. Our engi are thirty-five tons. We have cars that do not go as high as t

The Chair—What is your tonnage per year?

Mr. Craig—I could not answer that question exactly.

The Chair—Do you consider your rails of sufficient weigh

Mr. Craig—No.

Mr. Solon—I have had experience with rails of different forty-five pounds, sixty pounds and seventy pounds, and I come to the conclusion that the seventy pound rail is the and I hope to see the day when that rail will be universally You can make better joints and it is economy in every resp

In regard to the wheels, the last gentleman on the floor c the whole ground perfectly; I could not say a word in a Roadmasters sometimes are a little timid in making their as to imperfect cars, etc. They come in contact with the Mechanics, who generally cry "expense". They wan along just as easy as they can. You can't very well thing unless you really think it is dangerous. That is o this thing is neglected so much.

The Chair—Don't you think a Roadmaster, when he sees a wheel that is tearing his frogs and switches to pieces, ought to report it, regardless of any difficulty he may get into with the Master Mechanic?

Mr. Solon—Well, some men are very sensitive. Sometimes I put it off a little while, and then speak in a joking way, and then, if he don't take the hint, I put force on it, and then I fetch him. (Laughter.)

Mr. Lovell—Tbe Pennsylvania R. R. has two standard weights, sixty and sixty-seven pounds, the former being four and a quarter and the latter four and a half inches high. The general opinion seems to be that the web of the sixty-seven-pound is too light, and if the weight was increased to sixty-nine or seventy pounds, and the increase put in the flange and web, a better rail could be obtained. On certain parts of the main line there is still in track, subject to the same wear as any sixty-seven-pound rail, fifty-six-pound English steel, put in in 1866, in excellent condition, and better than sixty-seven-pound steel, American manufacture, put in in 1873; from which it may be a question whether it is not a rail of better quality, than of additional weight, that is desirable. The objection to the fifty-six-pound rail is that the joints are not strong enough, plain, not angle, splices being used.

Mr. Craig—I move we take the sense of the meeting on the best weight of rail for our present rolling stock, as a matter of economy.

Carried.

The Chair—I will put the question in this way: That all who would recommend a sixty-five pound rail or more, and not to exceed seventy pounds, will manifest it by saying "aye."

Carried unanimously.

Mr. Craig—Mr. President and Gentlemen of the Association: Our Convention is now drawing to a close. Before doing so I have a few suggestions to make. We have heard from all gentlemen present on frogs, and switches, and ballasting, and all other things pertaining to their duties. Now, in addition to that, we want to arrive at a standard. To do that, we will have to go to work in a different shape to what we have now. I have gained a great deal of valuable information. Now we are going to adjourn pretty soon to assemble in a year from now. With what we have heard here in the two days' session we have had, I think we can come back better prepared at the next meeting, to say a great deal more than we have at this. Now, I would suggest that a committee be appointed in each State, as near as the members can be arranged for, to report on rock ballast, and that a committee be appointed to report on gravel ballast, and a committee to report on frogs and switches, and so on—as many subjects as the Convention may decide. Next year, when you meet, let these committees report in writing, and the reports of the committees can be discussed. We can get the sense of the Convention on each particular report, and if the Convention thinks proper, we can recommend that as a standard. Anything we could do would not be binding upon any Roadmaster, from the fact it would have to meet the approval of our General Manager or Superintendent. Still, if I go from this meeting with a certain class of gravel as the sense of the meeting of the Roadmasters' Association of America, it would have a great deal more weight than if I were to go as an individual. I take the experience of from five to fifty years in this Convention to-night. I feel I do not want any better authority than that. I would be justified if it did not result as I expected. I would have the experience of these gentlemen to sustain me in it. As our worthy President said awhile ago, we want uniformity. We want uniformity of rail, of frog, of switches, of wheel. How are we to obtain that? We have got to take a step in that direction. Take the roads in the United States and Canada to-day; how many different patterns will you find of frogs and rails and switches. There is certainly one rail and frog superior to another. Let us find out which it is, and we can adopt that year by year. I think that would be a proper step for us to take. And with that explanation I would like to have the sense of the meeting.

There is another question. This room would not hold the Roadmasters of America. There are a great many who would like to be here. There are two States, to my certain knowledge, whose Roadmasters have not been invited, and if each member of this Association would take the matter up, he can do more to enlarge the Association in his State than all the correspondence can do. I feel to-day that I can return home benefited, and that every Roadmaster in my State would attend, unless prevented by something of great importance. An explanation from me of what is done here would have a great deal more to do with him than a circular would. I receive a great many circulars; it would occupy all my time to read them. If each and every member will take a personal interest, I think we can have twice the number present at our next meeting we have here to-night. The larger our body the greater influence will we have. We will learn much more by experience what is necessary. I will say again, I have learned a great deal by attending this Convention; so much that whenever one assembles, whether it be an annual or special meeting, if I am able I want to be there.

Another question: Some of the gentlemen seemed to have trouble getting transportation. I don't understand what the trouble can be. I don't find any trouble to reach any part of the United States on free transportation. I make a request to my Superintendent, who makes a request on the Superintendent of the line over which I propose to pass. I find no difficulty. I think all difficulties of that character can easily be removed. I think the duty we are performing will entitle us to it; we cannot devote ten days to any better service than this. We, as an Association, cannot accomplish everything at once; but the time is coming when the influence and the recommendations of the Roadmasters' Association of America will have a great deal more effect than it has to-night. (Applause.)

Mr. James Sloan—I second Mr. Craig's motion to appoint committees on the various subjects to be discussed, to report at the next meeting of the Association.

Motion carried.

The Chair—I would ask the gentleman if he would not add to that motion that the President and Secretary be authorized to name the members of said committees after returning home, and to inform the appointees by letter.

Mr. Craig—I will make that motion—that the President and Secretary elected at this meeting be authorized to name the committees when they return home, and notify the parties by letter.

Carried.

The Chairman—Mr. Sherwood says he will have at the depot to-morrow morning, at eight or nine o'clock, as may best suit the convenience of the members of this Association, an engine with coaches to convey the Association in a body to Cincinnati. I would like to ascertain how many will go.

Seventy-five members indicated a desire to go to Cincinnati, and on motion, the time to start was fixed at nine o'clock next morning.

The Chair—Mr. Fred. Weir, of Cincinnati, through his representative, who is here, extends an invitation to this Association to dine with him to-morrow at the Burnett House in Cincinnati. What action will the Association take in the matter?

On motion of J. W. Craig, the invitation was accepted.

Mr. Reed, Savannah, Florida & Western—I would move that a committee of five be appointed by the President, to report at the next meeting upon the proper method of instructing men for the foremanship in the track department of railroads.

Carried.

Election of Officers.

The rules were suspended, and on motion of Mr. Lovell, of the Pennsylvania road, the present incumbent, Mr. I. Burnett, of the Chicago, Rock Island & Pacific Railway, was re-elected as President of the Association by acclamation.

On motion of Mr. Lovell, Mr. D. Coleman, of the A., T. & S. F. R. R., was unanimously elected to the office of First Vice-President of the Association.

Mr. Lovell — Now, I would nominate J. W. Craig, of the Charleston & Savannah Railroad, as Second Vice-President.

Mr. John Sloan—I would nominate Mr. E. R. Mills, of New York.

A ballot was taken, which resulted in forty votes for Craig and thirty-five votes for Mills, and, on motion of Mr. Mills, Mr. Craig's election was made unanimous.

On motion of Mr. Mills, Mr. John Sloan, of the I., B. & W., was elected as Secretary by acclamation.

The Time and Place to Which the Convention Adjourned.

NOMINATIONS OF PLACE.

Mr. Craig—I move when we adjourn, that it be to St. Louis or Kansas City.

Mr. Coleman—I nominate Chicago.

Washington and Detroit were also named.

A ballot was taken, resulting as follows: Kansas City, 12; Chicago, 14; Detroit, 3; St. Louis, 5; Washington, 4.

Neither place receiving a majority of all the votes, a second ballot was taken, resulting as follows:

Kansas City, 16; Chicago, 20; Washington, 3; St. Louis, 2.

Neither place receiving a majority of all the votes cast, a third ballot was taken, resulting as follows:

Kansas City, 18; Chicago, 21.

The Chair—Chicago having received a majority of all the votes cast, when the Association adjourns it will adjourn to meet at Chicago.

The second Wednesday in October, 1885, was, on motion, fixed as the time to which the Convention will adjourn.

Mr. Coleman was called to the chair by the President.

President Burnett moved a vote of thanks to the proprietor of the Dennison House for the many courtesies extended by him to the Association.

Carried.

Also moved that the Association, having carefully inspected the wrecking frog of A. H. Palmeston, and witnessed the operation of the same, look upon frogs as something good for the purposes intended.

Carried.

A vote of thanks was then tendered by the Association to Theodore Pfafflin for the use of his hall; Charles Latimer, for his able address; Mr. Sherwood, Superintendent C., I., St. L. & C., for courtesies shown the Association; Fred. Wier, of Cincinnati, for his kind invitation to the Association to dine at the Burnett House; to President Burnett and Secretary Sloan, for their valuable services, and to the press of the city for its kind and lengthy reports of the proceedings.

President Burnett—I move the proceedings, as kept by Benjamin Weaver, the stenographer, be published in pamphlet form, and when completed, one copy be sent to each member of the Association.

Carried.

President Burnett resumed the chair.

On the suggestion of Mr. Jones, it was agreed that two copies be sent to each member.

At this point a proposition was read by the Secretary from the *Railway Age*—to publish the proceedings of the meeting—when Mr. Hills, of the Ajax Forge Company, asked the Association if they would be kind enough to accept the proceedings of the meeting as a compliment from them. If accepted, the book should be free from all advertising.

President Burnett--Gentlemen, you have heard the complimentary offer of the Ajax Forge Company. What will you do with it? For my part I think we are able to pay our printing bills, with all due respect to Mr. Hills.

Mr. Hills—I beg your pardon. I did not make the offer with such an idea. I know that you are able ; yet we have had the courtesies of the Association extended to us, and we have learned some things as well as yourselves, and make this offer with no mercenary motives, but as a compliment for courtesies shown us. We do not intend to fill the book with advertisements, but give you a nice clean book, and you gentlemen will confer a favor by accepting it.

Mr. Coleman—I move the Association accept the offer of the Ajax Forge Company.

Motion carried unanimously.

Mr. Craig—I move a vote of thanks be given to the Ajax Forge Company for the courtesy shown in this matter.

Carried.

On motion of Mr. J. Sloan, an assessment of one dollar was levied upon all members who joined the Association at Chicago and St. Paul.

Mr. D. Coleman—I would move that the Executive Committee be instructed to prepare a blank form of membership and present it to the different Managers of the railroads, with a view of procuring a pass to and from our meetings, when the applicant presents a fac simile of the one received by the Manager, signed by the President and Secretary of the Association, and bearing the seal of the Association.

Carried.

The Treasurer reported cash on hand, $140.55.

On motion the Convention adjourned to meet at Chicago on the second Wednesday in October, A. D. 1885, at ten o'clock A. M.

CONSTITUTION AND BY-LAWS.

ARTICLE I.

Section 1. The name of the organization shall be the Roadmasters' Association of America.

ARTICLE II.

Section 1. The officers of this Association shall be a President, First Vice President, Second Vice President, Secretary, Treasurer and the Executive Committee, consisting of five members, including the President and Secretary *ex officio*. The President shall be the Chairman of the Executive Committee.

Sec. 2. The officers shall be elected by ballot, and a majority of all the votes cast is required to elect. No officer to be elected for more than three consecutive terms, of one year each, except members of the Executive Committee. They shall be elected one for one year, one for two years, and one for three years. At regular annual meetings hereafter one member shall be elected for three years.

Sec. 3. The President, or, in his absence, one of the Vice Presidents, in order of election, shall preside at all meetings. In case of absence of both President and Vice Presidents, the members may elect a President *pro tem*.

Sec. 4. The Secretary shall keep the records of the Association and Executive Committee, conduct all correspondence, issue notices of all meetings of the Association and Executive Committee, and shall collect all fees and dues, pay them over to the Treasurer, and take his receipt therefor.

Sec. 5. The Treasurer shall keep the accounts and be charged with all the funds of the Association, and disburse them under the direction of the Executive Committee. He shall, at the annual meetings, or at any other time if required by the Executive Committee, furnish a statement of the funds, income, and expenditures of the Association.

Sec. 6. All bills against the Association must be approved by the Chairman of the Executive Committee before they shall be paid.

Sec. 7. The Executive Committee shall have the general management of the Association. Three members of this committee shall constitute a quorum at any regular or called meeting of the committee.

Sec. 8. Vacancies may be filled *pro tem.* by the President.

ARTICLE III.

Section 1. Regular annual meetings of the Association shall be held on the second Wednesday in September. Special meetings of the Association or the Executive Committee may be called by the President, if, in his judgment, it is for the interests of the Association to do so. Ten members of the Association shall be a quorum at any regular or called meeting of the Association.

SEC. 2. The place of holding the annual meeting shall be designated by a majority of the members present at a regular meeting.

SEC. 3. The order of business shall be as follows:

1. Opening ceremonies.
2. Reading the minutes of the last regular and any intervening meetings.
3. Enrollment of new members.
4. Reading communications.
5. Reports of committees.
6. Unfinished business.
7. Miscellaneous business.
8. Discussion of proper questions relating to duties of members, and appointing committees.
9. Election of officers for the ensuing year.
10. Choosing place of next regular meeting.

ARTICLE IV.

SECTION 1. No person shall become a member of this Association who is not a man of good moral character, and who is not a Roadmaster in good standing. If such, he may become a member by paying a membership fee of two dollars and fifty cents, and subscribing to the Constitution and By-Laws.

SEC. 2. The Executive Committee shall have power to levy assessments upon members for the necessary expenses of the Association.

SEC. 3. Any member may be expelled from this Association by a two-thirds vote of the members present at any regular meeting.

ARTICLE V.

SECTION 1. This Constitution shall be subject to revision at any regular meeting of the Association by a vote of at least two-thirds of all the members present.

PROCEEDINGS

OF THE

THIRD ANNUAL CONVENTION

OF THE

Roadmasters' Association

OF

AMERICA,

HELD AT

The Tremont House, Chicago, Ill.,

October 14, 15 and 16, 1885.

PUBLISHED BY
THE RAILWAY AGE PUBLISHING COMPANY,
CHICAGO.

PROCEEDINGS

OF THE

THIRD ANNUAL CONVENTION

OF THE

Roadmasters' Association

OF

AMERICA,

HELD AT

The Tremont House, Chicago, Ill.,

October 14, 15 and 16, 1885.

PUBLISHED BY
THE RAILWAY AGE PUBLISHING COMPANY,
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Proceedings of the Third Annual Convention

OF THE

ROADMASTERS' ASSOCIATION OF AMERICA,

HELD AT

TREMONT HOUSE, CHICAGO, ILL.

OCTOBER 14TH, 15TH AND 16TH, 1885.

The Roadmasters' Association of America assembled at 10:30 A. M., Oct. 14th, 1885, at the Tremont House, in Chicago, Ill., for their Third Annual Meeting, in response to the following call:

ROADMASTERS' ASSOCIATION OF AMERICA.

Office of the President,
JOLIET, ILL., August 15, 1885.

In accordance with the action of the meeting of Roadmasters, held in Indianapolis, September 14, 15 and 16, 1884, the Third Annual Meeting of the Association will be convened at the Tremont House, Chicago, Ill., for three days' session, Wednesday, Thursday and Friday, Oct. 14, 15 and 16, 1885.

I. BURNETT, *President,*
Joliet, Ill.

J. SLOAN, *Secretary,*
Indianapolis, Ind.

The President, Mr. Isaac Burnett, of the Chicago, Rock Island & Pacific Railway, called the convention to order, as follows

MR. BURNETT.—Gentlemen, the hour having arrived to which this meeting was adjourned from Indianapolis to meet in this city on the 14th, 15th and 16th of the present month, you will consider yourselves open as a convention for business. I will state that in a few moments Mr. Carter Harrison, mayor of the city of Chicago, will be here and deliver a short address of welcome; he was to have been here at 10 o'clock; until the mayor arrives I think it is not advisable to commence business.

In the absence of Mr. Sloan, our Secretary, Mr. D. H. Lowell of the Penna. R. R. will act in that capacity. I assure you, gentlemen, that it gives me pleasure to see so many of our old members present at this meeting. At Indianapolis, a year ago, we opened our meeting with fifteen of the old members present, yet at that meeting we enrolled seventy new members. I am in hopes to see that number largely increased at this meeting. I feel confident that when we get a membership of four or five hundred, a meeting will be well represented from the different roads, and knowing, as I do, that the calls of these meetings are solely for our benefit, to enable us to have better track with less expense to our employers. Better track is our aim, at the same time a sociability is arising that we should be proud of, when I look around me and see the aged members present it leads me to believe that in a few years these meetings will be attended by younger men, fully believing that they will keep up these meetings with profit to themselves and the railroads of the country. Gentlemen, we are not alone in this meeting; at two o'clock to-day the New England Roadmasters' Association meet in Springfield, Massachusetts, and as their object is identical with ours, would it not be well to send them a message of congratulations and good wishes for the success of their work? (Responses, yes, yes; certainly, etc.)

On motion of Mr. T. C. Kelly, it was voted that the president and secretary send the best wishes of this convention to the convention at Springfield.

The secretary, Mr. John Sloan, having arrived, called the roll and the following members answered to their names:

Adams, A. D.,	Wabash, St. Louis & Pacific Ry.
Adams, Thos.,	Baltimore & Ohio.
Adamson, Thos.,	Ohio & Mississippi.
Burnett, I.,	Chicago, Rock Island & Pacific.
Burnett, C. M.,	Central Iowa.
Brown, George M.,	Flint & Pere Marquette.
Bowen, B.,	Wisconsin Central.
Buhrer, C.,	Chicago, St. Louis & Pittsburgh.
Butler, John,	Illinois Central.
Brown, S. H.,	Chicago & Northwestern Ry.
Buel, H. A.,	Chicago, Milwaukee & St. Paul Ry.
Baxter, R. W.,	South Pacific Coast R. R.
Blemer, J. R.,	Toledo, Cincinnati & St. Louis Ry.
Cain, George E.,	Wabash, St. Louis & Pacific.
Cox, J. E.,	Chicago, Milwaukee & St. Paul.
Cornell, C. H.,	Chicago, Milwaukee & St. Paul.
Collopy, J. H.,	New York, Chicago & St. Louis.
Campbell, G. R.,	Ohio Central.
Coleman, D.,	Atchison, Topeka & S. Fe.
Cox, Frank,	Chicago, Rock Island & Pacific.
Carle, J. D.,	Burlington, Cedar Rapids & Northern Ry.

Doyle, John,	Detroit, Lansing & Northern.
Dwyer, Thos.,	M. L. S. & W.
Dunn, William,	Baltimore & Ohio Ry.
Donavan, J.,	Canada Pacific Ry.
Dickson, Thos,	Cleveland & Pittsburgh, (Penna. Co.)
Erwin, Wm.,	Kingston & Pembroke Ry.
Galarneau, F. X.,	Lake Erie & Western.
Grace, Perry,	Chicago, Milwaukee & St. Paul.
Hickey, Thos.,	Chicago, Rock Island & Pacific.
Houghton, R. B.,	Wabash, St. Louis & Pacific.
Hayward, Joseph,	Kansas City, St. Joseph & Council Bluffs.
Hennessey, P. H.,	Chicago, Milwaukee & St. Paul, C. B. Div.
Hammond, C. P.,	Richmond & Danville R. R.
Hickey, Thos.,	Michigan Central R. R.
Jones, C. E.,	Chicago, Burlington & Quincy.
Jordan, O. S.,	Michigan Central R. R.
Kelly, R. J.	Cincinnati, Indianapolis, St. Louis & Chi.
Kindilan, J.,	Chicago, Milwaukee & St. Paul.
Kerwin, J. A.,	Chicago & Northwestern Ry.
Lovell, D. H.,	Penna. R. R.
Lehman, C. A.,	Chicago & Northwestern Ry.
Lockie, Geo. J.,	Atchison, Topeka & Santa Fe Ry.
Laroix, Chas.,	Boston, Revere Beach & Lynn R. R.
Larr, G. W.,	Wabash, St. Louis & Pacific Ry.
McDonald, J. H,	Chicago & Northwestern Ry.
Mitchell, C. F.,	Chicago, Milwaukee & St. Paul.
Moran, J. T.,	Illinois Central.
Mayer, J.,	St. Paul, Minneapolis & Manitoba.
Mills, E. R.,	Southern Central.
McEntaffer, D.,	Wheeling & Lake Erie.
Melville, Chas.,	Wabash, St. Louis & Pacific.
McInarna, M. J.,	New York, Penna. & Ohio R. R.
O'Brien, Joseph,	Illinois Central R. R.
Preston J. H.,	Chicago, Rock Island & Pacific.
Pearson, J. H.,	Louisville, New Albany & Chicago.
Perry, J. A.,	Virginia Midland Ry.
Prestime, Byrom,	Detroit, Lansing & Northern R. R.
Plunkett, P.,	Milwaukee, Lake Shore & Western Ry.
Pierce, H.,	Cincinnati, Hamilton & Dayton Ry.
Raynor, T. M.,	*Chicago & Grand* Trunk.

Roach, P.	Ohio & Mississippi.
Reton, V. A.	Chicago, Milwaukee & St Paul.
Ryan, James	Chicago & Eastern Illinois.
Roberts, John	Indiana, Bloomington & Western Ry.
Rielly, Wm.	Chicago & Alton R. R.
Steen, R.	Chicago, Milwaukee & St. Paul.
Sloan, John	Indiana, Bloomington & Western.
Sloan, James	Chicago & Eastern Illinois.
Stockwell, C. H.	Chicago, Milwaukee & St. Paul.
Stafford, M. A.	Central Iowa.
Sullivan, J.	Illinois Central.
Shea, M.	Cin., N. O. & Tex. Pac.
Solon, A.	Chicago, Burlington & Quincy.
Shea, John F.	Utica & Black River Ry.
Stackhouse, R. J.	Danbury & Norwalk Ry.
Stimson, W. B.	Grand Rapids & Indiana R. R.
Tripp, Geo. B.	Chicago, Milwaukee & St. Paul.
Tierney, John	No address.
Tompkins, J.	Cincinnati, Hamilton & Dayton.
Unger, Nicholas	Flint & Pere Marquette R. R.
Wilson, D. C.	Wabash, St. Louis & Pacific.
Wright, John W.	Chicago & Northwestern Ry.
Walsh, N.	Canada Pacific Ry.

LIST OF OLD MEMBERS.

Adams, Thos	B. & O. Pittsburg Div.	Connelsville, Pa.
✓Adamson, Thos	O. & M.	Lawrenceburgh, In
Atherton, L. E	C. B. & Q	Keokuk, Iowa.
✓Burnett, I.	C. R. I. & P	Joliet, Ill.
✓Burnett, C. M	Central Iowa	Marshalltown, Ia.
Bailey, Isaac	W., St. L. & P	Griggsville, Ill.
Brown, Geo. M.	Flint & Pere Marq.	East Saginaw, Mich
Blesswan, J.	C. B. & Q	Creston, Iowa.
Breckenridge, W. L.	C. B. & Q	Beardstown, Ill.
Bowen, B.	Wisconsin Central.	Stevens Point, Wis.
Brink, J.	Wisconsin Central	Oshkosh, Wis.
Brennan, J. C	St. P. M. & M.	St. Paul, Minn.
Brenan, J. J.	St. P. M. & M	Minneapolis, Minn.
✓Buhrer, C	C. St. L. & P	Cambridge C., Ind.
Butler, John	I. C.	Pontiac, Ill.

Bennett, George	U. P.	Lincoln, Neb.
Brown, E.	U. P.	Rawlins, Wyo.
Beauprie, W. R.	C. & W. I.	Auburn Junc., Ill.
Boardman, E. A.	U. P.	Golden, Colo.
Burke, P. D.	C. P.	Calgary, Alberta.
Baker, R.	I. B. & W.	Urbana, Ill.
Boom, John P.	L. N. A. & C.	Frankfort, Ind.
Cain, Geo. E.	W. St. L. & P.	Peru, Ind.
Courtney, W. H.	L. S. & M. S.	Erie, Penn.
Crippen, J. A.	C. R. I. & P.	Des Moines, Ia.
Cox, A.	C. St. P. M. & O.	Le Suer, Minn.
Collom, J.	D. O. & O. R.	Olney, Ill.
Cox, J. E.	C. M. & St. P.	Sanborn, Iowa.
Cornell, C. H.	C. M. & St. P.	Dubuque, Iowa.
Carnes, E. H.	C. St. P. M. & O.	Worthington, Iowa.
✓ Craig, J. W.	C. & S.	Charleston, S. C.
Cummings, John	Can. P.	North Bay, Ont.
Collopy, J. H.	N. Y. C. & St. L.	Bellevue, Ohio.
✓ Campbell, G. R.	O. C.	Bucyrus, Ohio.
Coleman, D.	A. T. & S. F.	Topeka, Kan.
Cox, Frank	C. R. I. & P.	Atlantic, Iowa.
Doyle, John	D. L. & N.	Ionia, Mich.
Downing, G. W.	Formerly C. R. I. & P.	Wilton, Iowa.
Diddle, A. J.	I. B. & W.	Indianapolis, Ind.
Dwyer, Thomas	M. L. S. & W.	Manitowoc, Wis.
Evans, J. C.	Illinois Central	
Ervey, W.	C. M. & St. P.	Sigourney, Iowa.
Erickson, L.	T. C. & St. L.	Frankfort, Ind.
Finn, J. A.	N. P.	Billings, Montana.
✓ Galarneau, F. X.	L. E. & W.	Lima, Ohio.
Gregory, W. H.	C. M. & St. P.	Monticello, Iowa.
Grace, Perry	C. M. & St. P.	Waukesha, Wis.
✓ Griffin, M. J.	N. Y. W. S. & B.	Kingston, N. Y.
Gogerty, C.	N. P.	Billings, Mont.
Grogan, John	C. H. & San. An.	Schulenberg, Tex.
Guy, James	M. H. & O.	Ishpeming, Mich.
✓ Hickey, Thos.	C. R. I. & P.	Geneseo, Ill.
Hogan, M.	C. B. & Q.	Red Oak, Iowa.
Hedding, D. M.	C. M. & St. P.	Horicon, Wis.
✓ Houghton, R. R.	W. St. L. & P.	Defiance, Ohio.

Hern, T. A	C. M. & St. P	Calmar, Iowa.
—✓Hayward, Joseph	K. C. St. J. & C. B.	St. Joseph, Mo.
Hines, T.		Fairmount, Iowa.
Hyde, A. B	C. M. & St. P	Wells, Minn.
Hanley, M.	Fargo Southern	
Hennessey, P. H	C. M. & St. P., C. B. D'v	Perry, Iowa.
Hall, James M	L. & N	La Grange, Ky.
Harley, A.	A. T. & S. F	Emporia, Kan.
Hanover, H. D	Ohio & Miss	Aurora, Ind.
—✓Jones, C. E	C. B. & Q	Beardstown, Ill.
Keller, L. L.		
Kelly, R. J	C. I. St. L. & C	Kankakee, Ill.
Kelly, J. B	C. M. & St. P	
Kelley, M. D	St. P. & D	St. Paul, Minn.
✓Lynch, Pat	I. B. & W	Kenton, Ohio.
—Lovell, D. H	Penn. R. R	Renova, Pa.
—McMichael, Geo. C.	W. I. & N	Marshalltown, Iowa
McClintock, W. H.	L. & N	Louisville, Ky.
McDonald, J. H	C. & N. W	Escanaba, Mich.
Moll, J. B.	C. M. & St. P	Faribault, Minn.
McQuiston, J. C	C. I. S. L. & C	Indianapolis, Ind.
Meeker, C. R	C. B. & Q	Aurora, Ill.
Mitchell, C. F	C. M. & St. P	Mazomanie, Wis.
Mott, E. H	G. B. W. & St. P	Plover, Wis.
Moore, A.	C. I. St. L. & C	Greensburg, Ind.
—Moran, J. T	Illinois Central	Waterloo, Iowa.
Mayer, J.	St. P. M. & M	Delano, Minn.
McMillan, John	C. M. & St. P	Minneapolis, Minn.
Marsh, F. M	S. C. & P	Mt. Valley, Iowa.
Morris, T. O	C. I. St. L. & P	Indianapolis, Ind.
Mills, E. R	Southern Central	Moravia, N. Y.
Merrill, G. W	L. S. & M. S	Hillsdale, Mich.
McBride, James	W., St. L. & P	Jacksonville, Ill.
McDonough, M	Texas Pacific	Marshall, Tex.
✓McEntaffer, D	W. & L. E	Norwalk, Ohio.
Meeds, F. W	A. & P	Albuquerque, N. M
Morgan, J. F	N. P	Missoula, Mont.
—Melville, Chas.	W. S. L. & P	Havana, Ill.
Mahoney, M	W. C. & W. M	Chippewa F'lls, Wis.
McLeod, Anthony	U. P	Junction City, Kan

Nash, J. L	C. M. & St. P	Egan, Dak.
Nolan, P	N. O. & T. R	Oakdale, Tenn.
Nichols, E. M	C. R. I. & P	Joliet, Ill.
Preston, J. H	C. R. I. & P	Des Moines, Iowa.
Pease, W. S	C. M. &. St. P	Elgin, Ill.
Potter, W. H	C. M. & St. P., C. B. D'v	Tama City, Iowa.
Pearson, J. H	L. N. A. & C	Louisville, Ky.
Phelon, E. M	C. St. L. & P	Millbank, Dak.
Peters, P	A. T. & S. F	Topeka, Kans.
Rafferty, Thos	C. M. & St. P., So. D'v	Lanerston, Minn.
Raynor, T. M	C. & G. T	Battle Creek, Mich.
Roach, P	O. & M	Pana, Ill.
Ross, Danold	D. G. H. & M	Pontiac, Mich.
Reton, V. A	C. M. & St. P	Monroe, Wis.
Richards, O. D	L. S. & M. S	Andover, Ohio.
Reed, W. H	S. F. & W	Savannah, Ga.
Ryan, James	C. & E. I	Danville, Ill.
Robbins, W. L	E. & T. H	Evansville, Ind.
Rogers, James	L. N. A. & C	Louisville, Ky.
Robinson, T. V	C. St. L. & P	Algona, Iowa.
Reeves, O	C. & N. W	Marietta, Wis.
Steen, R	C. M. & St. P	Marion, Iowa.
Sagerdahl, Wm	C. & G. T	Valparaiso, Ind.
Swinney, S. L	W. St. L. & P	Bement, Ill.
Sutherland, A. M	C. & N. W	Florence, Wis.
Steele, J. R	W. St. L. & P	Forrest, Ill.
Sloan, John	I. B. & W. R'y	Indianapolis, Ind.
Sloan, James	C. & E. I	Danville, Ill.
Stockwell, C. H	C. M. & St. P	Coon Rapids, Iowa.
Stafford, M. A	Central Iowa	Brighton, Iowa.
Shattuck, C. D	C. M. & St. P	Faribault, Minn.
Sullivan, J	Illinois Central	Dubuque, Iowa.
Sanger, F. E	St. L. K. & N. W	Keokuk, Iowa.
Shaw, G. R	O. R. & N. Co	Portland, Oregon.
Shea, M	C. N. O. & T. P	Newport, Ky.
Salter, J. F	Miss. & Tenn	Sardis, Miss.
Steiner, J. L	P. D. & E	Grayville, Ill.
Solon, A	C. B. &. Q	Rock Island, Ill.
Smith, J. C	C. R. I. & P	Wilton, Iowa.
Thompson, W. A	C. & G. T	Blue Island, Ill.

Tripp, Geo. B	C. M. & St. P	Tomah, Wis.
Tierney, John		
Tompkins, J	C. H. & D	Lima, Ohio.
Wilson, D. C	W. St. L. & P	Ferguson, Mo.
Worcester, J. A	C. & N. W	Iola Grove, Iowa.
Wyman, M. P	Northern Pacific	Glendive, Mont.
Weatherston, John	Detroit & Bay City	Lapeer, Mich.
Wright, John W	C. & N	Madison, Wis.
Wright, David	C. M. & St. P	Red Wing, Minn.
Williams, G. M		Minneapolis, Mi
Witty, L B	I. W	Indianapolis, Ind
✓Wright, George	A. T & S. F	Topeka, Kans.

The following is a list of the members who joined the Roa masters' Association of America, at Chicago, 1885:

✓Adams, A. B	W. St. L. & P. Ry	La Fayette, Ind.
Brown, S. H	C. & N. W. Ry	Elroy, Wis.
Buel, H. A	C. M. & St. Paul Ry.	McGregor, Ia.
Bartlett, Daniel	K. C. St. J. & C. B. Ry.	St. Joseph, Mo.
Bolan, Jas	D. B. C. & A. R. R	East Tawas, Mic
Bolan, Mat	Central Iowa Ry	Ackley, Iowa.
Burgdorf, C. W	Union Pacific	Denver, Col.
Baxter, R. W	S. P. Coast R. R	Oakland, Cal.
✓Brown, W. F	W. & L. E. Ry	Norwalk, Ohio.
Blemer, J. R	T. C. & St. L. Ry	Marion, Ind.
Carle, J. D	B. C. R. & N. Ry	Watertown, D[illegible]
Cronin, Thos	Mo. Pac. Ry	Palestine, Tex.
Conners, J. S	Canada Pac. Ry	Winnipeg, Man.
Capwell, W. E	A. T. & S. F. Ry	Nickerson, Kan.
Dunn, Wm	B. & O. Ry	Newark, Ohio.
Donavan, J	Can. Pac. R. R	Winnipeg, Man.
Dickson, Thos	C. & P. Penn. Co	Wellsville, Ohio.
Erwin, Wm	K. & P. Ry	Kingston, Can.
Foracre, W. W	Ga. Pac. Ry	Douglasville, Ga.
Forbes, James	A. & N. M. Ry	Lordsburg, N. M.
✓Freeland, A. N	Atlantic Coast L. Ry	Sumter, S. C.
✓Fitzgerald, Thos	Shenandoah Vy. Ry	Shepardst'wn, W.
Gregg, R. D	I. I. & I. Ry	Kankakee, Ill.
House, F. E	C. M. & St. P. Ry	Marion, Ia.
Hammond, C. P	R. & D. R. R	Atlanta, Ga.

Hart, A. G	Central Pac. Ry	Promontory, Utah.
Henderson, J. C	Atl. & Pac. Ry	Daggett, Cal.
Hogan, John	N. P. Ry	Bozeman, Mon.
Hickey, Thos	M. C. R. R.	Jackson, Mich.
Hildebrant, J. D	Southern Kan. Ry	Lawrence, Kan.
Jordan, O. S	M. C. R. R	St. Thomas, Ont.
Kurdilan, J	C. M. & St. P. Ry	Mitchell, Dak.
Kenney, J	C. M. & St. P. Ry	Oxford Junction, Ia.
Keller, C. B	White Water R. R	Cambridge City, Ind
Kerwin, J. A	C. & N. W. R. R	Madison, Wis.
Lehman, C. A	C. & N. W. R. R	Sterling, Ill.
Lewis, Geo. W	D. & R. G. Ry	Durango, Colorado.
Loftus, P. H	C. & N. W. R. R	Milwaukee, Wis.
Lockie, Geo. J	A. T. & S. F. Ry	Newton, Kan.
Larvix, Chas	B. R. B. D. & L. Ry	Winthrop Jc., Mass.
Lee, W. F	C. R. I. & P. Ry	Keokuk, Iowa.
Linsley, J. H	C. B. & Q. Ry	Galesburg, Ill.
Larr, G. W	W. St. L. & P. Ry	Forest, Ill.
Marshall, James	Chi. & Alt. Ry	Huntington, Ind.
Mulcahy, Edward	C. W. & M. Ry	Elkhart, Ind.
Massey, O. M	N. P. Ry	Sprague, W. T.
Mahoney, D	O. M. Ry	Olney, Ill.
Moran, Thos	Chi. & Atl. Ry	Kenton, Ohio.
McInarna, M. J	N. Y. P. & O. R. R	Mansfield, Ohio.
McNarney, M	C. M. & St. P. Ry	Elgin, Ill.
Newcomb, G. B	North Eastern Ry	Florence, S. C.
O'Brien, Joseph	Ill. Cen. R. R	Champaign, Ill.
Perry, J. A	Vir. Mid. R. Ry	Charlottesville, Va.
Pustine, Bryan	D. L. & N. R. R	Ionia, Mich.
Philbin, M	C. R. I. & P. Ry	Joliet, Ill.
Plunkett, P	M. L. & W. Ry	Clintonville, Wis.
Pierce, H	C. H. & D. Ry	Connersville, Ind.
Roberts, John	I. B. & W. Ry	Columbus, Ohio.
Rielly, Wm	C. & A. Ry	Bloomington, Ill.
Rahm, John M	Penn. & N. Y. Ry	Towanda, Penn.
Ross, John	F. & P. M. Ry	Evart, Mich.
Sweeney, D	Den. & R. G. Ry	Canon City, Col.
Scott, J. W	C. O. & S. W. Ry	Cecilia, Ky.
Sullivan, Martin	Cen. Pac. Ry	Truckee, Cal.
Schofield, James	Northern Pac. Ry	Livingston, Mon.

Sharkey, P.	K. C. St. J. & C. B. Ry.	Council Bluffs, Ia.
Shea, John F.	U. & B. R. Ry	Ogdensburg, N. Y.
Smith, Richard	S. Pac. R. R	Woodville, Tex.
Stackhouse, R. J	Danby & Norwalk Ry.	Danbury, Conn.
✓Stimson, W. B	G. R. & I. Ry	Grand Rap., Mich.
Sheahan, D	C. I. Ry	Monmouth, Ill.
Thomas, I. L	G. H. & S. A. Ry	Houston, Tex.
Unger, Nicholas	F. & P. M. Ry	Ludington, Mich.
Worley, Geo	Hot Springs Ry	Malorna, Ark.
Walsh, N	Can. Pac. Ry	Three Rivers, Q'bec.
Walsh, Thos	Ohio & Miss. Ry	Mitchell, Ind.
Wagoner, J. C	Ft. W. C. & L. Ry	Ft. Wayne, Ind.
Worthley, A. H	K. C. St. J. & C. B. Ry.	St. Joseph, Mo.
✓Warren, Carson	C. C. & A. R. R	Chester, S. C.
Willis, R. A	C. St. P. M. & O.	Omaha, Neb.
✓Watts, T. J	Duluth & Iron Range.	Two Harbors, Minn.

The Chair—Gentlemen, allow me to introduce to you his honor, the mayor of the city of Chicago, Mr. Carter Harrison. (Received with applause, the members rising.)

Mr. Carter Harrison—Mr. President, and gentlemen of this convention, it will be sufficient for me to state to you as a reason for not being here promptly on time, that we have in Chicago no roadmasters who direct the opening and closing of the bridges; if we had, I should have been here exactly on time. ("Good," and applause.) It gives me much pleasure to meet you here. It has been my pleasure to meet and welcome to Chicago a great many aggregations of men met together in convention, some for the good of the people generally, but most of them, however, for their own special pleasure and benefit; some assemble for asthetic purposes, to improve the taste; some are laboring men, and it is as the latter that I think I can greet you. I believe every roadmaster has a "horny hand;" your business, I take it, is to have clear heads, cool brains, and brawny muscles; and knowing as we do in Chicago how much our safety, our lives, and property depend upon the thoroughness in which the great railroads centering in our midst are kept up, we feel the importance of most cordially welcoming to our city any body of men associated for the purpose of making doubly sure what has already been apparently sure, the great lines of railroads of which this is the mighty centre. (Applause.) No city like Chicago is so indebted to railroads! The lake and the little creek running through our midst long ago made us a thriving village and a prosperous town; it was the railroads, however, that took us by the hand, and it was the railroads that has enabled us to grow into a mighty city, with hopes that in a little while we will be at least the second, and will try hard to be the first city on this continent. What wonderful, magical advancement there has been in the past two-thirds of a century! The same year I came into the world—and I am yet a young man—my hair is grey because of newspaper abuse! Nothing else! (Laughter.) That same year, 1825, was built the first locomotive engine of the world. Why, until that time, this was simply a mighty globe of ours! Men when they attempted to go around the world bid farewell to their friends far and near, and when they returned—and there were only a few of them that did return—they were looked upon as mighty travelers. Why, when I was a boy, I would have gone a mile to see a man, simply, and to have looked upon a man who had been around the world. Now, our next door neighbor starts out of town, is gone a few months; we meet him again and say: "Where have you been? You have been sick a few weeks?" He answers, "Oh! no. I have been around the world," and then gives me a description of Japan and Tokio. The world has been made smaller by the ease with which the railroads have enabled us to compass it and pass from one point to another. Within sixty years of the existence of the locomotive, railroads have sprung up in America from ocean to ocean, and from the gulf to the lakes, and although there was at the beginning but one little band of road, one little strip of rail, there are now about 125,000 miles of road in America; I know, four years ago there were 80,000 odd miles, now about 125,000 miles, and another thing which is very pleasant a man feels perfectly safe in starting out upon one of them. One of our travelers, when he has been around the world and reaches San Francisco, can telegraph his wife, "I will take breakfast with you" at such an hour, "keep the coffee hot, and the buckwheats fresh," (applause,) and you enable him to keep that promise exactly, unless he arrives at Chicago and one of our bridges keeps him from getting across. (Laughter and cheers.)

We ought then to be deeply interested on this occasion. Many of you may have been contractors, and may have helped to build sections; if so, you have had no interest in the work other than to benefit the corporations that employed you, and also to benefit the people who are behind them employing you. It is your duty to keep your roads in such a condition that the switch can turn at a certain moment when the engine comes whirling along, and to see that death does not await its advent; to see that the grades and curves are properly placed, and are exact and made in the most approved manner; that bridges are in good condition, and it is by rare watchfulness and coolness on your part that danger and loss of life is averted. Gentlemen, if it was about election time, it would be said that this was a little "taffy," but I mean what I say. You look like men who use your hands, and there is evidence that your heads guide your hands. Let your heads while here be used in such a manner that you will benefit your employers and then you will benefit us all.

Railroads are mighty cormorants, grinding us down, but they are monopolies simply for the sake of dividends; and if you enable them to keep their roads in better condition they can secure their dividends and charge us less rates for fare and freight than we are at present paying. I, therefore, in the name of the city of Chicago tender you a hearty welcome. If you did not look so substantial I would say, if you got into trouble during your stay here we would willingly help you out; I would say to the policemen that you should not be watched too closely after 9 o'clock at night. (Laughter.) You will work during the day, and go to the exposition building before you depart, to see and learn something there; I will, therefore, not have you watched. I thank you for your attention and again welcome you to Chicago.

President Burnett—In response, your honor, in behalf of the members of the Roadmasters' Association, we thank you for your hearty welcome, and should any of us be *led estray* in this, "the wickedest city in the world," we shall look to you for protection. Yet, I feel confident that you will not be called upon in that direction.

The Secretary then read the message which had been prepared to be sent to the New England Roadmasters' Association, as follows:

Chicago, Ill., Oct. 14th, 1885.

To the New England Roadmasters' Association, Springfield, Mass.:

The Roadmasters' Association of America sends greeting to the New England Roadmasters' Association, with the hope that the present deliberations in Springfield and at Chicago may result in great benefit to the railroads of America.

I. Burnett, Pres't.

On motion of Mr. Coleman, adjourned until 2 p. m.

AFTERNOON SESSION.

Wednesday Afternoon, Oct. 14th, 1885.

The convention was called to order at 2:30 p. m., President Burnett in the chair.

The Chair—This is our third annual meeting in addition to the preparatory one, and as yet we have come to nothing definite in the discussions in any of our meetings. The matters we have taken up for discussion have ended about where they were left before, yet a great deal of good sound talk and valuable ideas have been advanced. I hope every question considered at this meeting will be discussed and disposed of in a proper manner and in a manner creditable to ourselves and we will thus show to the roads we represent that we come here for a good object, to compare the opinions and information we have gained and to secure results, and if we are wrong, or not positive in what we are about to decide upon any particular question, let our decision be made in such a manner that it can be reconsidered.

Now the first question before this convention for discussion is railway switches, and the committee appointed on this question was John Sloan, H. D. Hanover, and J. B. Moll, and as Mr. Sloan is chairman of the committee, I will ask him if he is prepared to report?

MR. JOHN SLOAN—I. B. & W. Ry.—I have not done anything in regard to the matter except to think it over. I have not been able to see the other members of the committee and confer with them. I would ask until to-morrow to consider this question and make a report. Granted.

THE CHAIR—The next question for consideration is "railroad frogs and guard rail distances." The chairman of that committee is D. H. Lovell, the other members are John Sloan, John Doyle, and E. R. Mills.

The report was read by Mr. Lovell as follows:

REPORT OF COMMITTEE UPON RAILROAD FROGS AND GUARD RAILS.

Your committee upon "Railroad Frogs and Guard Rails," would respectfully report as follows:

1. Relative merits of stiff rail and spring frogs and life of same.

Your committee is of the opinion that the spring rail frog is superior to the stiff rail, and that its life is possibly three times that of the stiff rail frog.

2. Which is better—a frog riveted to a plate, or held by clamps and bolts?

Opinion is very evenly divided as to which is preferable, although the life of a riveted frog is considered to be greater than a clamp frog. The loosening and rattling of the rivets make it objectionable as compared with the clamp; but in point of ultimate economy, opinion rather favors the riveted frog.

3. What is the best total length for a frog, and should its length be equal from its point?

The best total length for No. 8 to No. 15 spring rail frog seems to be 15 feet, and for a stiff rail frog not more than 10 feet. However, for the purpose of making them interchangeable, your committee recommends the consideration of a uniform length of 15 feet.

4. What should be the guard-rail distance? What width of channel or throat of frog?

To suit the present wheel limits, 4 ft. 5⅜ in. as adopted by the Master Car-Builders' Association, and 4 ft. 5 in. as adopted by the 4 ft. 9 in. system of roads, (principally Pennsylvania Railroad,) the guard-rail distance should be 2 inches, and the throat of the frog the same. Roads running only 4 ft. 8½ in. cars may find it advantageous to use 1¾ inch guard-rail distance and the same for throat of frog.

5. Should the gauge be exact at point or loose? How much loose, and why?

The guage at the point should be exact; the proper gauging point being about six (6) inches back of the actual point. Your committee would advise greater carefulness in this particular on the part of maintenance-of-way men, and urge the importance of permitting no variation from the exact guage through frogs and guard rails.

D. H. Lovell, Chairman.
John Doyle,
E. R. Mills,
Committee.

The report was accepted and the committee discharged.

Geo. R. Campbell—O. C. Ry.—The kind of guard rail should have been given, and whether a long guard rail, or one-half moon, or what size! The question arises how long this guard rail should be, and whether it should be turned off at the ends, or maintain a certain distance from the main rail all the way! Now, there is a difference of opinion about that! I am of the opinion that a one-half moon guard rail put within six inches of the head of the point of frog, is the best, while others do not agree with me. Now, a long guard rail continuing close to the main rail holds the wheel snug up against the wing of the frog; if it maintain its distance all the way it will pull off the wing of the frog, but if you make it considerably curved with a sharp point opposite, you have all that the guard rail requires and do not pull your frog down. Many insist upon putting guard rail braces on it to hold it stiff; I do not approve of that.

The Chair—I think the discussions upon the different subjects should be confined to the order in which questions are given in the report of the committee. We should adhere in our discussions to the outline of the report. Heretofore in our discussions we have wandered too much. Let us commence at the top and criticise the whole report as we go down.

On motion of Mr. Lovell, it was decided to take the sense of the meeting, after discussion, upon each topic mentioned in the report.

The Chair—Then the points for our consideration are: "1st.—Relative merits of the stiff rail and spring rail frogs and life of same. Your committee is of the opinion that the spring rail frog is superior to the stiff rail, and that its life is possibly three times that of the stiff rail frog."

MR. LOVELL—The committee thinks the spring rail frog is the best; now, we would like to know the sense of this meeting, and then take a vote on it. Our report simply brings the matter before you for your action.

MR. C. E. JONES—C. B. & Q.—I think the spring rail frog is the best, but I am a young roadmaster and should like to hear from others. I always supposed that modesty was a virtue th roadmasters did not possess until I atterded this convention. We younger members are anxious to hear from those older and more experienced.

MR. MCINARNA—N. Y. P. & O.—Spring rail frogs when properly made are the safest and most durable for railway service One of them will last at least twice or three times longer than the best rigid frog.

They never should be made without a bottom plate either riveted or clamped to them and to which the spring rail should be made fast in order to keep it as low as the point of the frog, because, if it is higher where the width of the point is equal to the tread of the wheel, it would have the same effect in derailing a train that the outside rail of a split switch would if it was higher than the switch rail.

The chief trouble I think heretofore with spring rail frogs has been, that with many, found broken in the track after causing accidents, they were imperfectly made, which rendered them more dangerous than rigid frogs.

I have used spring rail frogs for the last 12 or 13 years. I commenced using them first in Michigan, and during the last 10 years on the N. Y. P. & O. R. R. I have had them in constant use. When I first used them in Michigan, we had a spring rail for both tracks. As soon as I commenced using the frog with spring rail on the N. Y. P. & O., spring for the main track only, I found it to be preferable to any other. We then received a few that were imperfectly made because there was no plate under them. To ensure safety I made a rigid spring of it, but some roadmasters said it was not quite as safe as a rigid frog, and I endeavored to remedy it by putting a block of wood two inches wide between the points and the inner rail; however, since that time we have been using the spring rail frog altogether upon our road and consider them the best frog that was ever made and as safe as a rigid frog.

Mr. Campbell—G. R. & I.—The reason for using frogs of a shorter pattern is to save steel, it wears out quickly; if you put in a 15 foot frog it is soon gone, but not as quickly with the spring rail frog as with the rigid frog. I am in favor of the spring rail frog, 15 feet long, properly made.

A Member—What would you consider a properly made frog?

Mr. Campbell—I am not mechanic enough to tell you, but there are good mechanics who know how to make them. I think the Penna. Steel Co. make a very fine spring rail frog. I have not had much experience with them, however, the argument is all in favor of the spring rail frog; I so consider it at least.

Thos. Dickson—Penna. R. R.—I approve of the spring rail frog. I would not have a large plate under the throat; all I would ask is a small plate under frog on two ties. With a large plate you should get back to old principles, by using two plates, as far as my experience has gone, keeps it from cutting in the ties.

Mr. R. R. Houghton—W. St. L. & P.—I have had some experience in the last two or three years with the spring frog, and I am decidedly in favor of the spring frog as described in the report.

Mr. Jones—C. B. &. Q.—We have many engines with double flanges, and the rigid rail being an inch and three-fourths or so away from the point the driver of an engine will strike that point very hard and soon wears out the wing rail, while the single spring rail frog, closing tight to the point, gives a better bearing for the driver and does not wear the spring rail as much as the rigid rail. I have been using them about 8 years and think them about twice as long in life as the rigid rail frog.

John Tierney—W. St. L. & P.—It is considered by nearly every person who has used the spring and rigid frogs that the spring frog is the most durable, but that it is not the safest frog; I have never known an accident to occur on a railroad on account of bad frog, but that it invariably occurred from the use of the spring rail frog. I think our president, Mr. Burnett, can tell you a little about his experience in that direction on the Rock Island road. On that road they have about as good a track as upon any railroad in the country, and they have always kept their frogs in good condition; yet all serious accidents that have ever occurred on that road, caused by bad frogs, I think have been owing to the use of the spring rail frog. I observed that on the

Erie Railroad over twenty-five years ago, and on portions of the Pennsylvania Road, and on every road I have been connected with, that they have always had trouble with the spring rail frog —still the spring rail frog will last two or three times as long as the rigid frog; but the safety is the main thing to consider, and it is a very important thing, for the cost of one train wrecked will buy a great many frogs, and it is safety that we should all endeavor to secure.

MR. COLEMAN, of the A. T. & S. Fe. called to the chair.

MR. BURNETT—*Gentlemen:* The Rock Island road has used a good many spring rail frogs, and they have used some good ones as well as some poor ones. But because they have used a poor spring rail frog it should not condemn a good spring rail frog. I have now one spring rail frog that has laid in our main track for eleven years. I have several that have been in use on the Illinois Division from five to nine years, and they are a pretty fair frog to-day. We had some spring rail frogs made and they were a failure, and only so in the manner of construction; we had no serious accidents from those at all, while we did have four freight trains off the track in one night and the whole four were off at one time—two at one station and one each at two others, and these frogs were taken out. We have some spring rail frogs now, working well; and I fully concur with the report that the spring rail frog will last as long as three rigid frogs, and they are equally as safe, if properly made and attended to as they should be. They are not only economical, because they last longer than the rigid frog, but with rolling stock passing over them the jar is removed which you must inevitably get from the rigid frog. We find that our rigid frogs wear from eighteen to twenty-four months, and many of them wear less than one year. All railroad companies are anxious to use their material up as closely as possible, as it is safe to do, at least, and after those rigid frogs become battered adjacent to the point they are left in the road oftentimes too long, and the jar on the wheels and machinery, and everything that passes over them, is increased. We have had some accidents from rigid frogs.

I believe that if a spring frog will last for six or eight years on the Rock Island road, while a rigid frog will last only from eighteen to twenty-four or may be thirty months, it is safe to say—both made of the same steel—that the spring rail frog will outwear three of them. They cost but a trifle more in construction, if any. I would recommend, always, to put them on plates. The weak point of a rigid frog is invariably opposite the point where the wheels pass over the throat, and when your rigid frog gives away there your point goes with the wing rail, so that it is always impossible to repair it; you have to put in a new point, and if your side track is much used that rail is too much worn on the other side. All roads are trying to get something that will make an unbroken track. The future may develope that.

As to the size of the plate, I would recommend a plate in width from eight inches, in front of the point, to a reasonable distance back, wide enough to take the spring out of the rail at all times, and that plate should be five-eighths to three-fourths of an inch in thickness.

As to the wear, the durability and economy of a spring rail frog between that frog and the rigid rail frog, there is no comparison, it is all in favor of the spring rail frog. The only question then that arises is: is the spring rail frog a safe frog, or equally so, as compared to the rigid frog? If you decide that it is as safe, there is no comparison, and no man can make one.

Regarding the safety of the spring rail frog, we know that some years ago many railroads were equipped with spring rail frogs from one end of them to the other of the main track. I know of a railroad that was so equipped that had an accident ten years ago from the spring frog, and the fact of the matter was the bolt passing through the spring rail of the frog, and fastened to the plate, was broken off, and it was found had been broken for several days and was unnoticed. This left the spring rail without anything to hold it to its position on the plate, and the point of the rail was low and it was thrown out and derailed a passenger train, and the order went forth to remove every spring rail frog on that line, and it was done as rapidly as possible. Now, that accident was simply the result of the carelessness on the part of the men who had charge of the road. The same accident might have occurred in case of a rigid frog. Well, what was the final result? A few years have gone by and that same road is again equipped with spring rail frogs. Now, why was this? Simply because a few years ago the spring rail frog was not made as well as it is to day. There are spring rail frogs made to-day, beyond a doubt, that are equally as safe as any rigid frog ever made.

MR. JOHN DOYLE—D. L. & N.—In 1872, on the Saginaw Valley & St. Louis Railroad we put in nine of those spring rail frogs and they have been used every day since with the heaviest trains running over them, and there is one in the yard that every engine coming out of the house has run over every day, and I am certain that frog will last four years longer. The spring rail frog of course requires attention. You may have a frog riveted to the plate, stationary rail, you also rivet the point, and some will say the rivets get loose. Well, you can put a bolt through any place and unless the nut is screwed down tight and attended it will not remain firm. If you put a rivet through the plate and the wing rail and it is not riveted down, it will become loose. In putting the point together on the spring rail frog, it has to go together with a bolt or rivet, and we put in a piece of flat iron about one inch by two and a half inches so that we never have any trouble about the rivets coming out of the frog.

We have put in stiff rail frogs, and clamped frogs, and bolted frogs, and have not been able to keep one in the track for five years, while it is plain that if a spring rail frog will wear twelve years with proper care and attention, and is equally safe, and a rigid frog will not wear more than four years at the outside, the decision must be in favor of the spring rail frog.

The length of the spring rail on the frog we use is about twelve feet. About four feet six inches of it moves back and forth, and it cannot move further on the plate; if shoved up snug, it is a rigid frog. We use a thread and bolt coming through the knee and a rubber spring and iron box on each—you may have a rubber spring or coil spring, which throws it tight against the frog—and then there is a 2½ by 3½ strap used on the plate, so that snow or ice cannot raise it up; it must run on the rail all the time, and the rod that runs through keeps the spring rail from expansion or contraction.

MR. COLEMAN—A. T. & S. F.—I have not had experience much with the spring rail frog; it has been entirely with the rigid frog, so that I cannot enter into a discussion of the question to any great extent. I do not know that I have ever had an accident caused from a frog of any kind; however, I know from what I have seen of the spring rail frog on other roads, and the way it works, and the manner in which it is handled, at least it seems to me that it is the most economical frog, and also the most durable, lasts longer with less noise and racket than any other frog. The rigid frog after being worn awhile with the flanges of the wheel dropping into them make a great racket and noise. I have not used the spring rail frog, but I saw the frog Mr. Burnett spoke of when we were coming over the Rock Island road, and it is a good frog yet. I do not see where the spring rail frog can be unsafe so long as it has a good spring of one and a half inches, because that is the limit of the spring.

Mr. Tierney—Mr. Doyle remarked in his speech that there is considerable of the frog that is secured only by the bottom plate, and when a train strikes that it is easy to break it; you have a support under it, it is true, but it moves when the train is passing over it. Of course, a rigid rail frog, if not riveted, is liable to break, but there is four feet there that moves enough to prevent it from breaking, so that if the ties are not well tamped under it, and if there is frost in the ground in the spring it is liable to break.

Mr. Coleman—But that being on the main track and of proper guage I do not see why the train should spring it out at that point any more than anywhere else.

Mr. Tierney—It don't spring it out, but up and down, you put one of them in the yard and they are of no account at all, where the switchmen are careless; trains get off the track and tear it all to pieces.

Mr. Burnett—I do not wish to be misunderstood in this matter. I would not recommend spring rail frogs for all roads, roads new and unballasted where they can hardly keep their rigid frogs on the ties or between the fences sometimes. Now, as to this matter of moving the spring rail of the frog, it moves two inches in a four foot distance, if it is secured as Mr. Doyle says by two rubber springs, one on each side of the rail, thoroughly strapped and riveted to the plate; then the trains or locomotives passing over it simply take a straight line across it. The idea that the simple little variation will cause that rail to break is absurd; if that be true, throw out all your stub switches as soon as possible; you have 30 feet without a spike in them, no support of any kind except the tie beams, and what one of you ever knew of a derailment from a broken switch rail of a stub switch?

have had them broken and no accident occurred on that account. There you have 30 feet, and if your head block is thrown up in the winter time by frost it is in bad shape; you have all seen t, and shimmed your rails up on the top of the ties even; you have all done it from necessity, and here with the spring frog you have 8 or 10 feet, and that is secured to a rigid rail that does not move. I think there is no room for comparison.

Mr. Adams—B. & O. R. R.—I have had some experience with frogs; I have always used the stiff frog, but am very much in favor of the spring frog. They wear long and ride easy. With a spring frog, the rail comes close up to the point, and it kept in proper position; I do not know why it should not wear as long as any common rail. I have them in for 10 and 15 years and the frog still good. In old times we used to make them out of iron rail, and then we did not have the same improvement on the spring as now. Since we have had these springs in use we have put them four feet from the point of the frog. I think if you put the spring in proper place there is no danger of the frog breaking. There are some frogs where the spring is only two feet from the point, then the whole pressure comes on the spring, and when it is broken it is liable to be caused by a bolt being tight; if the spring is in the proper place on the rail, the rail will not break.

Mr. Lovell—I desire to say on behalf of the committee that the opinion expressed in the report on frogs is not alone the opinion of the committee individually; it is an opinion based on information received from reliable sources. Some time ago I submitted to a number of competent roadmasters, selected from our leading railroads, a list of questions, and among them were some in regard to frogs. The first question was—"Which do you think the better frog, the stiff rail or spring rail?" The next question was—"Have you had much experience with the spring-rail frog?" The answers to these questions I hold in my hand. It is noticeable that this opposition to the spring rail frog is invariably from those who have had little or no experience with it; and upon the other hand the most strenuous advocates are those who have used it for years.

The first of these papers is from a roadmaster on a road of a tonnage of 11,000,000 in 1884, and in reply to which he thought was the better—a stiff rail or spring rail frog, he says: "Stiff frog;" and in answer to the second question—if he has had much experience with the spring rail frog, he says: "No." The next four are from men on a road of a tonnage of 23,000,000 in 1884, who have used the spring rail frog for years, and their answer is "spring rail;" and their replies as to life, average 5½ years for spring rail, and 2½ years for stiff rail. The next is from a road of a tonnage of 9,000,000, with spring rail as the answer, and 7 years for the spring rail as against 3 years for the life of the stiff rail frog. The next is from a gentlemen who is now present, and connected with a road of a tonnage of 5,000,000, who answers: "Six years for spring rail, as against 2½ years for stiff rail.

Without going any further into detail I will say that about 30 per cent. of the answers favor the stiff rail frog, and 70 per cent. prefer the spring rail, with an average life of 6.2 years for the spring-rail, and 2.7 years for the stiff rail frog.

On the division with which I am connected, with a tonnage in 1884 of nearly 5,000,000, there are thirteen spring-rail frogs in main track, which were put in in 1877, and the supervisors report that they are good for a long time yet. About sixteen months ago it became necessary to extend one of our important passing sidings. At the west end there had been a No. 8 spring rail frog, and when the extension was made a No. 12 stiff rail frog was used. In less than six months it had to be replaced, and the one in at present is almost worn out. I could cite other instances by way of comparison.

THE CHAIR—I understand this is a question of durability *and safety.*

MR. LOVELL—There does not seem to be any question as to the durability of the spring-rail frog; but there does seem to be some uncertainty as to its safety. During the twelve years from 1872 to 1884 there have been reported by the press fifty-seven accidents attributable to broken frogs, but I fail to find that any very serious accident has occurred from a spring rail frog breaking. The spring rail will break occasionally—there is no question about that—but the break does not usually result seriously. Several years ago, when on our main line as supervisor, one of our fast passenger trains broke the spring-rail near the point of frog, and went over it all right, as did all other trains until the next morning when it was discovered. While I admit that the spring rail frog is not a perfect frog, it is being improved, and i is expected that the objections to it, which are very natural an reasonable, will be remedied in time; and as to results from experience it is not fair to condemn it as not being durable nor safe. If it is unsafe, why is it that after ten or more years of constant use these old experienced men still adhere to it?

I have taken considerable pains to inform myself as to the cause and extent of the fifty-seven accidents from frogs in the period from 1872 to 1884, and I am satisfied that some of the frogs in question were stiff frogs, and also that the accidents were usually very trifling, and that some were not due to the frog at all. One happened on the B. & O., and the gentleman present from that road has informed me that it was the switch and not the frog that caused the accident. Any one not having had much experience with it can readily find objections to the spring-rail; but it is nevertheless a fact that those best acquainted with it continue to prefer it. A bad rail, or faulty construction, particularly if it is left for the section foreman to bend and put in the spring rail, will invite accident, and unjustly bring into disrepute a good thing; but a spring rail frog properly made is good and safe enough for me.

Mr. McInarna—In regard to those frogs where accidents occurred, do you know how they were made? Did they have plates under them?

Mr. Lovell—If I recollect, the frog in question had a plate under it. We find that where there is bad steel in the frog there is greater liability to break. It was the spring rail that broke, having been worn by hollow tread wheels, which is the most prolific cause of damage to stiff as well as spring frogs.

Mr. Hayward—K. C. St. J. & C. B.—I have not had much experience with spring rail frogs for the last 18 years until within about two years ago, then the C. B. & Q. put 44 of them in some tracks I had charge of. Those frogs I have had to take out this summer. I have rigid rail frogs, put in at the same time, that are good yet; I find those upon the C. B. & Q. give quicker than our rigid rail frogs. The rigid rail frog we build wears out any frog I have yet had to do with, with the same weight of steel. The frog is well filled, I know; the wings are supported where the tire comes across them, supported by two plates, both riveted. The rivets are put in hot, and never get loose until the frog is worn out. They are riveted on the ¾ inch plate, 12 foot frog, 6 foot point.

Mr. Adamson—O. & M.—I have had a little experience with both spring and rigid frogs. I admit that there is more durability in the spring frog, properly made, than in the rigid frog and where there is a universal guage. The O. & M. is run on the 4 ft. 9in. guage, and you strike a spring frog and it has that much further to move. We have the rigid frog riveted on a ¾ths plate with charcoal iron rivets, and give a steady approach into the frog, and it makes a good frog. I am satisfied from my experience,—and I have seen spring frogs on the N. Y. P. & O. and the O. & M.,—but for safety I would recommend a rigid frog. We have had several spring frogs to take out, but I admit that they were not made as good as at the present time. On the O. & M. we had several accidents on account of the rails breaking, particularly in bad snowy weather; since that we have adopted the rigid frog. The breaking of the frog was caused by the defects in the manufacture, and the quality of the steel being poor, and the bad weather, all combined. I am in favor of that continuous frog; the model of which I have here, (pointing,) without any point at all. (Sensation.)

Mr. Jones—I have about 25 spring rail frogs on the main track. We have never had an accident from a spring rail frog, while I have been in charge of the division I am now on. I consider them for durability, safety, and economy, the best.

Mr. Jordan, having been called upon to express his views, came forward with his application, said he was not a member, but on motion of Mr. Doyle the rules were suspended and he was admitted to membership.

Mr. Jordan—M. C. R. R.—Speaking of spring rail frogs, I have had but little experience with them. Our frogs are steel rail frogs, riveted to the plate. Our standard frog is 1 to 11, and we have found they last us from eighteen months to two years. The spring rail frog was used on the valley road some 14 or 15 years ago. I think we used them for about four years. We had some accidents caused by the spring rail frog, and as soon as the Michigan Central took hold of the road they took out those spring rail frogs and replaced them with the standard frogs, but it seems to me the spring rail frog, properly made, would be as safe and much more durable than the stationary frog; I do not see any reason why it should not be, but, as I said before, have had but little experience with it.

THE CHAIR—We have heard from quite a number of gentlemen in regard to spring rail and rigid rail frogs, and I would suggest that a motion be made, to get the sense of this meeting, in this way: That we would recommend the use of the spring rail frog, when properly made, in preference to a rigid frog, upon lines that are well ballasted and in good shape, and more particularly in warm climates.

A like motion was made and seconded, and the chair decided that the discussion could continue with the motion before the house.

MR. BUHRER—C. St. L. & P.—I do not think the spring rail frog is a safe frog; they have been tried and so decided in several ways. I represent the C. St. L. & P. Ry. They are not used on that line to any great extent, and not considered safe because their points break; the spring rail breaks and derails trains; they have had accidents by reason of these frogs where we never had an accident from the rigid frog where the guard rails were properly put in. We now use a frog riveted to the plate manufactured by us.

MR. MCINARNA—Mr. Tierney and others present have objected to the spring rail on account of the distance the spring-rail moves. If the spring rail frog is properly made there is a plate fastened to the bottom plate by means of rivets, two inches from where the rail is closed up to the point of the frog, so that as soon as the wheel opens the spring rail it cannot open any farther than two inches; and, also to secure it, there is a horizontal bar passing through the spring rail; that is also bolted to the bottom of the plate keeping it at all times on a perfect level with the point of the frog, and at the same time the bar riveted to the bottom plate is an inch thick, two inches wide and four inches long. They are built with us so that as soon as the spring rail is opened it can only go two inches.

Another point made is that they have been the cause of accidents. Now, I have heard of accidents, one about a year ago a little west of Mansfield, upon a road where an excursion train passed. The report came out that the accident was caused by a spring rail frog, when upon investigation it was proven that the driving wheels of the engine *passed over it*, and that that engine had a hollow wheel and had been ordered into the shops for some time previous, but owing to the scarcity of locomotives on tha day this defective engine was sent out; other trains had passed over the road that day, but this engine went off the track and broke the frog.

Mr. Buhrer—If that had been riveted it could not have broken out.

Mr. McInarna—But the main cause was the defective wheel on the engine?

Mr. Buhrer—Yes; the spring rail flies out in a case of that kind, while if riveted if would not.

Mr. McInarna—A gentleman spoke in favor of a short plate. My experience is, that the long plate is better, as you have an even bearing. If you have a short plate, as soon as the rail leaves the plate you do not have an even surface. You must have an even surface as far as possible.

Mr. Preston—C. R. I. & P.—I have had some little experience with both spring rail and rigid frogs, and while my experience has been greater with the rigid frog than with the spring rail frog, right here I will mention that five years ago I was put on record as against spring frogs; that was during the first meeting at Niagara Falls, I think. I have somewhat modified my opinion since that time, and so far as my experience has gone, between the two frogs, the rigid and the spring, I have found the rigid frog to be the better frog only in this respect, that our rigid frogs, so far as I have had anything to do with them, have been more correctly made; the workmanship has been better; and where I have known accidents with a spring frog, in my opinion it has been through faulty construction, and at the present time I am rather of the opinion that the rigid frog is the best, unless we can get a spring frog more perfectly made. Some two years ago I had a couple of spring frogs made—made according to my own idea—one of them we put in the Council Bluffs yard on the main line, where every train coming into the station and going out had to pass over it, and the frog to-day, after being in two years, is as good as it was the day I put it in. This frog is manufactured with 4½ steel rail—the others were manufactured with 4 inch steel rail. It has been in use about the same time and with about the same wear, but the frog is made altogether different from the original way of making spring frogs, or from anything I ever saw. We leave the spring rail entirely loose, and put a bolt through the heel of it, and then cut a slot through the standing part, the web of the rail, and it works on a sliding bar two inches thick; not any side rail spring between the rail; it is on a plate a little over 40 inches long and about one foot and a half wide. Now, the question has come up here which is the best? If I was called upon to vote upon which is the best at the present time, the way they are at present manufactured, I should vote in favor of the rigid frog; while, at the same time, I believe that a spring rail frog can be made that will be better than a rigid frog. I do not think we have struck exactly the right point in the manufacture of the spring rail frog.

Mr. Dickson—All I have to say is, that since I made a few remarks there has been a question raised about the safety of the spring rail frog. I have used them for several years, and one of the first spring frogs that caused an accident with us was caused by a broken bolt, and the result was the next engine that came along ran off. The frog was not as perfect as the frogs are now made. I immediately put braces on the back of the rails, and now I fail to see where there is any more liability to accident on the spring frogs than on any other. My experience has taught me that a spring frog is perfectly safe. (Applause.)

Mr. Roach—I have had experience with both frogs—the rigid and spring rail frog. I have had a rigid frog in the track for eight years, and it occurs to me that that is very good service for a rigid frog. We should take into consideration the safety as well as the durability of a frog, and in order to cover those two points it seems to me the rigid frog should prevail rather than the spring frog; I would prefer it for safety, yet the spring rail frog I prefer for durability.

The Chair—The question whether the spring rail frog, when properly and thoroughly made, is equally as safe and more durable than the rigid frog, it should be understood is the one we are to vote upon.

The motion was put, and upon a rising vote 23 voted on each side.

The Chair—The vote stands a tie—23 on each side. We will again put the motion, that a spring rail frog, properly and thoroughly made, is equally as safe and more durable than rigid frog. All in favor of that motion will stand up.

The result was 22 on each side—a tie again.

Upon Mr. Lovell's suggestion that all those voting again the spring rail frog, who had had but little experience with th frog, should arise, was acted upon, and a large number arose.

Mr. Preston—This motion, as I understand it, is: "Is n a spring rail frog, if properly and thoroughly made, as good an safe a frog as the rigid frog? I will volunteer the stateme that perhaps one-third of the gentlemen present have not h more experience than I. Now, if well and thoroughly made— have not decided in my own mind in regard to it—I dou whether you have four men in this room who have decided their own minds what a perfectly made spring rail frog is.

On motion of Mr. Jones, the sense of the meeting was tak on the question of the durability of the spring rail frog as co pared with the rigid frog, and decided in favor of the spring r frog—70 to 0. Also, as to whether a spring rail frog is equal as safe as a rigid frog, when properly made, which resulted in tie—23 and 23.

Mr. Houghton—I would move that it is the sense of th meeting that a spring rail frog is not as damaging to rolli stock as the rigid frog; seconded by Mr. Lovell, and carried 50 to 0.

The Chair—The next section of this report for our conside ation is: "Which is the better, a frog riveted to the plate held by clamps and bolts?"

Mr. John Sloan—We have in use on our road about 1 plate frogs. The plate 14 by 22, 42 inches long and ¾ in thick. The frogs are all riveted with $\frac{5}{8}$ inch rivets. Some them have been in use from one year to ten years, with 18 or trains a day over them. We find they last on an average abo six years. The rigid frogs with these plates are counter-su on both sides, preventing them from breaking out or loosenin

Mr. Bowen—Wis. Cent. R. R.—I have had some experien with bolted and clamped frogs. I have had clamped frogs use only one year, and was obliged to take them out, while the same yard on another track I have had the riveted frogs, a those are still in use and have been in use four or five years my certain knowledge; they were there when I came there, an are yet good, while the bolted frogs and clamped frogs I find do not last over a year.

The Chair—Was there as much traffic over your riveted frogs as over the clamped frogs?

Mr. Bowen—Yes, sir; a little more.

Mr. Buhrer—We use the clamped frog and riveted frog on our line, and find that the riveted frog is much better than the clamped frog. We have never had any trouble with the riveted frog.

Mr. Doyle—I am in favor of a riveted frog. They work better than the clamped frog. If you rivet the frog on a ¾ inch plate 4 feet long and 18 inches wide, I think they will outwear any frog I ever used, and I have used most every kind of a frog; that is, if they are put up in good shape, and if the rivets are riveted down tight to the plate and the rail when they are made. For the last 20 years I have watched the Michigan Central frog riveted to the plate and have never seen any that would outwear them. I think a frog stands better on a plate than put up in any other way. Many frogs are made by taking a piece of iron and bending it up between the wing rail of the frog and frog point, and, if the ties get loose under there, of course something must give and it will shove up and is liable to break at the plates—that is one reason why I am in favor of a riveted frog. I have never seen the clamped frog that would not work loose. I think they ride as good as any frog, unless it is a spring rail frog.

Mr. J. H. Pearson—L. N. A. & C.—Have you ever used a bolted frog?

Mr. Doyle—We have never used but few of these, and we find that the great difficulty is in the bolts breaking. If I were to use a frog other than a riveted frog, I would use one bolted through and through, like the one Mr. Wier makes at Cincinnati. Our bolts clamp the same as Mr. Wier's, however. Mr. Wier claims that he has frogs of that kind that do not break.

Mr. T. M. Raynor—C. & G. T.—Those are the best frogs ever used.

Mr. Coleman—The frogs on the roads I am engaged on are all rigid frogs. We have one riveted frog in at Valley Falls, made by the St. Louis Co.; it has been in since 1877, with an average of ten trains a day over it since that time, and the frog is yet a good frog. With our Elliot frogs and Wier frogs it is almost impossible to keep enough bolts on hand to keep them in repair. The cause of their breaking so much I cannot give, but we have a great deal of trouble with them.

Mr. Hayward—I am using the riveted, bolted and clamped frogs. I find the points of the clamped frog go down; the frog riveted at the point keeps up, and one of them will outwear any two of the bolted or clamped frogs, and I have tried them side by side.

Mr. Bowen—I have been using a frog that had but one bolt in it and no rivets, and it is the best frog I ever used for a rigid frog. There is one of them here on exhibition; they are the best rigid frog I ever saw. The best riveted frog I have had anything to do with is made by the C. M. & St. P. R. R. Some riveted frogs will outwear two frogs of other kinds, and yet I have seen those that would not last any length of time. I have used a clamped frog, but would prefer a riveted frog.

J. T. Moran—Ill. Cent. R. R.—The riveted frog I prefer to any frog made; however, there is a little feature about it that must be remedied by putting plates at the weak place where the wheels cross, and I think it is then perfect.

Mr. H. Pierce—C. H. & D.—On the C. H. & D. road we have used the frog made by Mr. Wier, of Cincinnati, yet we have only had them a year or two; they are bolted with 10 or 20 bolts, three or four inches apart, and filled, extending a foot each way from the point. They give us very good satisfaction for the time we have had them. The old bolted frog with cast filling wear out very soon.

Mr. Pearson—I am using five or six different kinds of frogs: the Elliott, the Wier, and the Morden frogs, also the Emery frog, and one we manufacture ourselves, also the Ajax frog, and one that was in use on the road when I came.

The Chair—Which do you think is the best?

Mr. Pearson—We think the best of the lot is the one we manufacture ourselves. (Laughter.) That has been in use eight or nine years. It is a solid cast steel point frog; the cast steel is made by the Chester, Pa., company, and we manufacture the wing rail and put them on ourselves. I have seen no other frog that is as good; that has been our experience on the road.

Mr. McInarna—We use the one made by the Pennsylvania

Steel company, and one we make ourselves. We began to use the one we manufacture ourselves on account of the safety attached to it, and experimented upon it until we got it to that point of safety that satisfied us, and could rely upon it we found, and about a year ago received those frogs from the Pennsylvania Steel company, made on the same principle of those we had been manufacturing, and we are now using them. They are 15 feet long and riveted instead of clamped. I am satisfied from my experience that the riveted frog lasts the longest. The rivets are not as liable to get loose as clamps are, and they do not interfere with the expansion and contraction of the rails. In my opinion the plate under the frog should be 18 inches wide, 4 feet long, and ¾ of an inch thick, as Mr. Doyle suggests—and a frog of that description I think every gentleman in this room, if he were to see it in use, would pronounce perfect.

MR. BURNETT—Mr. McInarna! Roadmasters as a class are not inclined to believe the articles they make themselves, or have made, in their own shops, are better than others! They would not be naturally prejudiced, would they? It looks that way to me. However, I may judge wrong.

MR. MCINARNA—They might; however, we have not been by any means; we have given information freely and liberally to others, and have gladly received points from them. We have improved by the suggestions we have received, and, adding those suggestions to our own experience and knowledge, I think we have obtained a perfect frog now.

THE CHAIR—I should be pleased to see a perfect frog.

MR. JONES—I have not had much experience with the clamped frog, and have only observed it on neighboring lines. I have used the riveted frog, a plate 18 inches wide and 4 feet long. As far as my experience goes, I consider the riveted frog the best.

MR. W. B. STIMPSON—G. R. & I.—I would like to inquire if the plate is laid on the tie under the frog; does it not interfere with tamping up?

MR. JONES—No, sir; we always use tamping bars, and the plate does not trouble us.

MR. DOYLE—I find no trouble in that direction in tamping with the tamping-bars. Tamp one-half way from one side and half way from the other.

Mr. Pearson—Don't you have to sink the head of your rivets into the ties?

Mr. Doyle—Yes, sir; we cut out to let the plate into it and the rivets also.

On motion of Mr. Jones, the sense of the meeting was taken in regard to the comparative durability of the frogs, or whether the riveted, bolted or clamped frog is the best—and it was decided in favor of the frog riveted to the plate by the following vote:

In favor of the riveted frog, 31; clamped frog, 1; bolted frog, 7. Several did not vote.

The Chair—The next question to consider is: "What is the best total length for a frog; should its length be equal from its point, in a 1 in. 9 to 1 in. 12 for main lines?"

Mr. Coleman—This would be governed altogether by the length of the lead; it is not a very important matter with that exception. By being governed by the length of the lead, I mean simply to avoid the cutting of the rails in putting in a switch. In order to avoid cutting rails I would be in favor of using a 15 foot frog, 7½ feet in each direction. In that case we have only to cut one rail in putting in a switch, and that length might be used for any frog.

Mr. J. Tompkins—C. H. & D.—We cannot establish the length of frogs. The spring rail frog we make 15 feet long; one in 10, 10 ft. long; one in 9, 9 ft. long, etc., according to the number of the frog.

The Chair—What would be the objection to making the frog always 15 feet long instead of 10 feet or 9 feet in numbers from 8 to 12?

Mr. Tompkins—The frog would wear out quicker than the rail; and in making it 15 ft. long you would have to throw a part away. Now, with a one in 10, 10 ft. long, there is not much of the rail wasted after the frog is worn out, and that is the reason we should select 10 ft.; if you use 15 ft. that much more of the rail is wasted. With a No. 9 frog you can make them shorter and you have a wider angle; with a No. 5 frog, 10 ft. long, you have an ugly looking thing, and the balance of it would not be good and would have to be thrown away.

The Chair—Do you use No. 6 frogs in your main line?

Mr. Tompkins—Yes, sir, the same as any other on the main line. No. 6 is the lowest we have in the main track; we cast a frog 6 ft. long.

Mr. McInarna—Do you mean rigid frogs, or spring frogs?

Mr. Tompkins—Rigid frogs; the spring rail frogs are 15 ft.; we do not make them any less than 15 ft.

Mr. Bowen—We use a one in 10 frog, 11 ft. long. We use no stub switches of any description; have none on the line; it makes an 85½ ft. lead to point of frog. We do not have to cut any steel to put in our frogs.

Mr. Pearson—I think with reference to the length of frog, when it comes to the spring rail frog, it should be as near 15 ft. as possible; as a matter of economy it should be so arranged that it may be cut out of a 30 foot rail. I think the same in regard to stiff rail frogs; they should be cut out of a 30 foot rail, or part of the 30 foot rail, as that is the proper length of rail all over the United States. We use on our road 15 foot frogs for a spring rail frog, and make them out of 30 ft. rails.

Mr. Jones—As upon a great many sections and roads the section force is very small, about a month ago I took the matter up of cutting down the length of our spring rail, for the shorter the spring is the better it is on account of handling with a small force, and hence I advocated the cutting down of our spring frogs. By so doing it has the spring of the rail itself, making the spring rail move where we clamp it together; 10½ will make it 6 ft. from the point; the length of the frog would be 16 feet.

Mr. Doyle—We make our spring frogs the same length that Mr. Jones does his, only our point is 7 ft. long instead of 6 feet, making it 15 ft. long, 8 feet from the point to the toe; 7 ft. from the point to the heel; 6 ft. from the knee to the toe, making 15 feet in length, with the split switch that goes in without cutting any. I think that for a main line frog we are not using any one in 6, one in 5, or one in 7 on the main line. As a general thing we use one in 8,—would it not be a good idea where you took out a spring frog 15 feet long, to be able to put in a rigid frog of the same length? It would go in without cutting any. We do not generally have anything less than one in 8 on the main line, and the rigid frog should be the same length; there are no rails to cut; the expense of steel in those frogs is not very great; we are getting good price for old steel anyhow. We have taken some of the one in 8 and made them into a one in 6, so that there is nothing lost by having a rigid frog; you can drop it into the same place where the spring frog was, or change a riveted frog to a spring frog, if necessary.

Mr. Lovell—We have used the spring rail frog, 16 feet long, and found that 15 feet would answer just as well. It is just as Mr. Doyle says, it is an easy thing to replace a spring rail frog with a frog of equal length, and for that reason, in the report of the committee it was the supposition, I think, that the length need not be necessarily equal from the point, but should be sufficiently long to get an angle splice at the heel, and inasmuch as the stiff rail frog should be used in yards more, we did not care to have them so long; but it seems to me that there should be a uniform length from point to heel, the same with a stiff rail as with a spring rail frog, so as to only have to cut them at one end. I think in order to reduce the length of the stiff rail frog, if it is advisable, that a uniform length from point to toe should be adopted the same for the spring rail as for the stiff rail. It is a question in my mind whether it is just the thing to use a whole length 15 foot stiff rail frog.

Mr. McInarna—I do not think it is desirable to use a stiff frog as long as a spring frog, as we use a spring frog in the main track in the majority of cases, and the stiff frog 15 feet long would be very awkward to handle; I should say make them 10 feet long, with one in 8, 8 ft. long, etc.

The Chair—The question of the length of frogs has been somewhat overlooked. I think it is not what you use on the road, or what we have been using, but what is the best length? That is the question. And it is presumed that the question refers to main line frogs, frogs used in sidings leading from the main line. And in my opinion they should be not less than 1 in 9. There is certainly a length that is the best. Now why cannot we make some effort to find that length? Several make the objection that a 10 foot frog when worn there is less steel thrown in the scrap. Now, that is a mistake, for if you use a frog 15 feet, 9 ft. from point to toe, 6 ft. from point to heel, then when your frog becomes worn to the extent that you are compelled to renew it you will find that its wear is but about eighteen inches directly opposite of the point, the balance of your wing rails are yet good. You can then make a 10 ft. frog from the good steel you have in the worn out 15 ft. frog. This frog you can use on branches or on sidings.

Now, if that be true—and it is a matter worth looking into—it is a saving of that much of the steel you would otherwise throw away. You would then wear it out once in a 15 ft. frog, and once in a 10 ft. frog. It seems the question should have a little more consideration and thought. It is quite an important question. A frog that will fit in Maine should fit in California, and I see no reason why it cannot be done without any additional cost or trouble.

The simple fact of cutting the rail to make a frog "cuts no figure, for we can get a rail of any length we need, but the 30 ft. rail cuts pretty well to a 15 ft. frog where the point stands 9 ft. from the toe. Nearly all who have spoken on the matter seem to think that because they have used certain lengths as a matter of fact that length is right; well, is it right? Certainly, with all this diversity of opinion, someone is wrong. Let us try to find out who that wrong man is." (Voices: "Correct," "that is right.") In all things, similarity is what you desire and what we are seeking.

Again, what roadmaster would recommend the using of a piece of rail in his track 10 ft. long if he could use 15 ft. instead? I don't believe one of you would.

Adjourned until 8:30 A. M. Thursday morning.

SECOND DAY'S PROCEEDINGS.

The convention was called to order at 8:30 A. M., President Burnett in the chair.

THE CHAIR—We have several invitations to visit different points and I think it would be as well to dispose of them this morning. I will say that for to-morrow morning the C. R. I. & P. R. R. Co. tenders you a train at any hour that may please you to go to South Chicago to the rolling mills and back by the way of the city of Pullman, and arrangements have been made, I understand, with Mr. Pullman to allow you to go through his shops, buildings, opera house, etc. The Rock Island invitation is good to any other point you may wish to go upon their line.

The C. B. & Q. Ry. makes a request through the Ajax Forge Company that you take a train from their depot and look at their inter-locking system and the *manufacturing* establishments along their line, also the Ajax Forge Co.'s works; and I would further state that at South Chicago you can visit Mr. Morden's Frog and Crossing works.

From the Chicago & Alton road we have invitations, through the Joliet Steel Co., to visit Joliet and examine the Joliet Steel Company's works.

(Read by the secretary as follows, and on motion all were accepted:)

JOLIET STEEL CO.
CHICAGO, 13th October, 1885.

To I. Burnett, Esq., President Roadmasters' Association, Tremont House, City:

DEAR SIR—I have much pleasure in extending to you and the members of your Association, together with their ladies, an invitation to visit the Joliet Steel Company's works at Joliet, Ill., to examine the process of manufacturing steel rails, from the raw iron ore to the finished product.

The Chicago & Alton R. R. Co. have courteously offered to place a special train at your disposal for the above purpose. Will you be good enough to inform me whether any of your members desire to avail themselves of this opportunity, and if so, *what the number of the party will be*, and *what day* will be the most convenient for them? I would suggest that the train leave the Chicago & Alton depot at 8:30 A. M., so as to be ahead of the Day Express; we would reach the mills about a quarter before ten and we can return at our convenience when the inspection is over. Hoping to have the pleasure of seeing you, I remain,

Yours truly, W. R. STIRLING, *Treas.*

Gentlemen, let us finish up the work, and if we work as we should we will close our questions before us to-day and to-night. We do not wish it to go broadcast through the country that we came here and played, and ran around the country on excursions; let us finish up our work.

When we adjourned last night we had not completed the discussion of the question: "What is the best total length for a frog, and should its length be equal from its point." The committee says:

"The best total length for No. 8 to No. 15 spring rail frog seems to be 15 feet, and for a stiff rail frog not more than 10 feet; however, for the purpose of making them interchangeable, your committee recommends the consideration of a uniform length of 15 feet."

Now this question was thoroughly discussed last evening, and I think should be disposed of without much further discussion.

MR. LOVELL—In order to hasten business, and inasmuch as it has been discussed at length, I would move that a length of 15 feet be recommended for the spring rail frog, and say nothing at all about the length of the stiff rail. I judge from what I hear that that would be the most acceptable.

Motion seconded by Mr. McInarna and carried.

THE CHAIR—The next subject is: "What should be the guard rail distance? What width of channel or throat of frog?"

The committee have reported as follows:

"To suit the present wheel limits, 4 ft. 5⅜ in. as adopted by the Master Car-Builders' Association, and 4 ft. 5 in. as adopted by the 4 ft. 9 in. system of roads, (principally Pennsylvania Railroad,) the guard rail distance should be 2 inches, and the throat of frog the same. Roads running only 4 ft. 8½ in. cars may find it advantageous to use 1¾ inch guard rail distance and the same for throat of frog."

On motion the association recommended the guard rail and throat distance as presented by the committee.

THE CHAIR—The 5th item for discussion in the report of the committee is: "Should the guard rail be exact at point or loose? How much loose, and why?"

The committee recommend as follows:

"The gauge at the point should be exact; the proper gauging point being about six (6) inches back of the actual point. Your committee would advise greater carefulness in this particular on the part of maintenance of way men, and urge the importance of permitting no variation from the exact gauge through frogs and guard rails."

MR. MCINARNA—In regard to making the gauge exact to the point of frog, I think that it is a mistake, from the fact that no matter how tight or firm the guard rail is, as soon as the pressure of the wheel comes against it it will strain it and loosen it, and you will find that the wheel will move it from ⅛ to ¼ of an inch; during my experience I have put down frogs by leaving the point of frog ¼ of an inch loose, and then ease up and bring it to an exact gauge, and I would prefer that to bringing the frog to an exact gauge at the point of frog.

MR. LOVELL—On the part of the committee I would state that we should not consider the actual point of the frog as the gauging point; that, we understand, is doubtful, but it should be a straight line passing by that point parallel with it and on the gauge line; we took the distance back of the actual point as the gauging point.

MR. MCINARNA—I would *recommend* one-fourth of an inch loose, we have it that way on our entire line, of the N. Y. P. & O. R. R. The point of the frog is one-fourth of an inch loose and it is a tight gauge from one-half way between the point to the heel.

The Chair—The committee recommend 6 inch back of point for gauging point.

Mr. Lynch—It seems impossible to decide exactly how to have the guard rail at point of frog, and all roads are not alike in their gauge; some are 4 feet 9, some spike 4 feet 8½, now we have to press our wheels off to 4–8½, others are 4 feet 9; you can not regulate it to a certainty; it must be made to conform to the road; with 4 feet 8½ distance, it must be made a little wider.

Mr. Bowen—Our frog's openings are 1 inch and ⅞, our guard rails are 1 inch and ⅞, and our frog is spiked to an exact gauge, and I am here to find whether that is right, or not. It does well of itself, but I wish to know whether it is the right way to do.

Mr. Dickson—Take a line and draw it tight from the heel to the point; put your main track rail down and gauge to that line, and you will find in almost all cases that you will have from ⅛ to ¼ of an inch wide gauge at the point. If you put that a tight gauge at the point and all the way through, you will have a little short kink in your main track rail. With a frog properly made, you cannot gauge it tight to the point or you will make it too tight. Gauge 6 or 8 inches back of the point. Your line thrown through those points will give you a gauge 6 or 8 inches back of the point, and you will get a straight line on your main track which you try to maintain. Now, I move that the report of the committee on that question be recommended as the sense of this meeting.

Seconded and carried.

The Chair—"The elevation of curves and gauge of track" is the next question. The committee is W. H. Reed, David Coleman and Thomas Hickey. The chairman of the committee is not here and he has taken no action on it. The balance of the committee requests that further time be granted, and that the question be carried over to the next meeting.

On motion the request was granted.

The Chair—We will now consider "Foot-guards for frogs and switches." The committee is J. H. Preston, David Wright and A. Cox.

Mr. Doyle—I move that the recommendation of this association on frogs and guard rails be referred to the association of railroad superintendents for their approval or rejection.

Motion seconded and carried.

Mr. Preston—I am one of the committee on foot-guards for frogs and switches, and I have had no definite reply from the other two members of the committee. What information I have received on the subject I have tried to put into proper shape, but have not done the work to my satisfaction; I, therefore, ask that the association grant the committee further time within which to make a report; we would like until the next meeting.

Mr. Pierce—I would move that we take up the discussion of this subject without a report from the committee.

Motion seconded and carried.

The Chair—Mr. Pierce, will you open the discussion?

Mr. Pierce—I do not know anything about the subject; I am seeking information. ("Good," and laughter.)

The Chair—Mr. Preston, you were the chairman of that committee, now, will you tell us what you know about it?

Mr. Preston—I went so far as to get the miles of road that the Hart foot-guard was on; it seems that it has been placed on nearly 17,000 miles of road. I sought this information with a view of investigating the matter, and wrote to the different roads using it to get a decided opinion as to what the value of it was. The Rock Island road is using it, and we find it to be the best thing we have tried so far. There are several other roads—unnecessary perhaps to mention—that are using it. For the reason that we could not make a full and complete report now as to the merits of it, I asked for further time. I have not yet secured the mileage of the roads using plank and rubber, and some I understand are using cement, and some coal cinders; and I find the foot-guard question is an important one, and it requires a great deal of correspondence to secure the facts in the case. I would like now to ask this association the second time to grant the committee further time to make the report. I do not think there is a gentleman present who is not interested equally with the committee in securing full and complete information on this question, and now we have not the facts in our possession *to enable us to recommend* anything.

On motion of Mr. C. M. Burnett, the committee on foot-guards for frogs and switches were granted another year within which to make their report.

THE CHAIR—We sent a message of congratulation yesterday to the New England Association of Roadmasters now in session, and I have a reply which the secretary will read:

"SPRINGFIELD, MASS., Oct. 14th, 1885.

"*To I. Burnett, Pres't, and Members of the Roadmasters' Association of America:*

"The New England Roadmasters' Association accepts your greeting and hope that the unbroken bands of iron and steel which unite East and West, North and South, may be emblematic of the feeling of brotherhood existing between the two associations.

A. C. BEANE, *Pres't.*"

THE CHAIR—The next question is the handling of coal for locomotives. This is a question suggested by Mr. Latimer. The committee are Thos. Hickey, Thos. Adamson and C. E. Jones.

The report was read as follows:

"*To the Members of the Roadmasters' Association of America:*

"Your committee, appointed to make a report upon the question of 'handling coal' for locomotives, would respectfully submit the following:

"After receiving answer from a large number of circular letters of inquiry sent to superintendents upon the subject, we find a maximum price of 30 cents per ton for hauling coal over platforms of different constructions, and a minimum of 11 cents per ton, making an average of 19.4 per ton.

"And where coal chutes are used we find a maximum price per ton of 9 cents and a minimum of .045, an average of .074 per ton, and an average of 12 cents per ton in favor of chutes. Time consumed in taking coal from chutes, one minute, and from other devices 12 minutes, a saving in time of 11 minutes for each engine coaled, in favor of chutes; and where 3,000 tons of coal is handled monthly, we find a saving in favor of coal chutes of nearly $4,500 over other devices. And your committee would recommend that the question of handling coal for locomotives be referred to the Association of Railroad Superintendents.

T. HICKEY,
C. E. JONES,
THOS. ADAMSON,
Committee."

On motion of Mr. Lynch, the Association accepted the report of the committee, the committee be discharged, and the report referred to the Association of Railroad Superintendents.

Carried unanimously.

THE CHAIR—The next question in its regular order is, "The weight and form of rail with joint."

The report was read as follows:

"Your committee appointed to make a report upon the 'Weight and Form of Rail, with Joint' would respectfully submit the following:

"1. *Weight.*—For the rail of the quality at present manufactured, and to suit the present spacing of cross-ties, your committee would recommend two standard weights—60 pounds per yard for light and 70 pounds per yard for heavy traffic.

"2. *Form.*—They would recommend that the form be substantially that shown on the attached drawing, the base to be equal to the height, and the radius of the top of the head to be the same as that of the fillet of the wheel, ½ inch preferred.

"3. *Joint.*—Your committee do not feel prepared as yet to recommend a joint. The double angle splice makes a superior joint, but inasmuch as this subject is at present receiving considerable attention in railroad circles, and as there are good forms of joint, which merit attention, they would recommend that it be discussed and continued to the next meeting.

D. H. LOVELL
T. HICKEY,
C. BUHRER,
Committee.

On motion of Mr. Jones, the report was received and the committee discharged.

MR. LOVELL—On the part of the committee, I desire to say that we were uncertain about the exact form of either of these two rail sections, (showing;) whether the radius of the head of the rail should conform to the radius of the fillet of the wheel. This rail (showing) is supposed to be a 70 pound rail. (Illustrated on the black-board.) This is the same weight of rail, (showing,) and was recommended by the general superintendent of a prominent road, and is made so as to avoid cutting the spike. The other rail we have here is of the same weight, only the radius is smaller than that. Both have good qualities, the only difference being in the points I have mentioned. Either of these figures can be attached to the report, whichever is adopted. One of them conforms to the rail used by the Lehigh Valley, only the latter is heavier and higher. The other is a little heavier than the Pennsylvania rail in the flange and in the web.

MR. BROWN—I would move we *recommend* the adoption of the general form of rail, without regard to weight, as shown o the left hand of the board, No. 1 on the diagram.

Seconded.

THE CHAIR—This is an important question, and we should be careful and go on record right.

MR. LOVELL—I will explain the proportions of the two rails as shown on the diagrams: No. 1 is the one adopted by the Penna. R. R., and conforms to the recommendation of their master car-builders; however, the master car-builders have not decided what the radius should be. The report of the committee prefers ½ inch, and will be governed by the temper of the fillet of the wheel. The height of the rail—it is a 70 pound rail—is 4½ inches. The width of the web of the rail is ½ inch, the same as the other. The radius of the upper part of the head is ½ inch in both cases; the distance across 2½ inches. The only difference in the rail is, that this (No. 2) gives a little greater support to the head, and the only difference in the two rails is really in this (marked on the diagram with chalk); they are substantially the same, except the difference I have marked. The question is to have a support for the head, and I think the general shape of either of these two heads (showing) is what we should have. I do not think we would make a mistake in attaching either of these two diagrams to the report. With these rails it does not make any difference what the weight of these rails are; the splices or angle bars always fit.

MR. BUHRER—I think that rail No. 2, as shown on the diagram on the board, is better than the other rail for this reason: Our spikes are cut out by the flanges of the rails more or less, and that rail, No. 2, has more support for a spike than the other rail. Another thing: we all know that our joint fastenings are not strong enough to support the joint. Rail No. 2 offers a better opportunity to use a heavier splice bar than No. 1 on the diagram, and by that we will gain an important point in our joint.

MR. MCINARNA—The weight of the rail should be governed by the amount of rolling stock and the amount of traffic upon the different roads. A rail 75 lbs. to the yard I believe would be the proper weight for most of the roads in the country to use. The weight should not be considered so much as the quality of the rail, because no matter how heavy it is, it is useless as soon as the surface becomes rough and it must be removed; and the only reason for increasing its weight would be in order to increase its stiffness so as to enable it to carry the load required of it without danger of breaking. Its shape should be such as will conform as nearly as possible to the tread of the wheel. I would prefer this form, (No. 1 on the board,) because it bears most upon the splice; there is more stability there. I would also recommend that the flange of the rail be similar to No. 1 in the drawing. That, I think, is preferable to No. 2. It corresponds to the shape of the head of the spike. I do not know that it will make much difference whether the base of either rail conforms to the head of the spike, and for that reason the rail we want is that which will not cut into the head of the spike. Whichever one has those qualities is the one we should recommend.

A motion of Mr. Jones to postpone the further discussion of this question until the next meeting, upon a rising vote was lost, 33 to 13.

The Chair—I would say that this is an important question, and you are putting yourselves upon record. No one wishes to leave this meeting and have the actions of the association criticised; I know I do not. This is a matter that will bear a great deal of thought, and we should not be hasty. My understanding is, that the Master Car-Builders' Association has recommended a rail similar to No. 1 on the board. I suppose before they recommended that they tried to find out what the wheel-maker thought of it. There is certainly a weak point in the wheel, and from what information I can get from the wheel-makers, it is at the point where the flange diverges from the tread of the wheel. Now, if that form of rail will lessen the wear at that point, it is of great importance.

The motion now is, that the association recommend the adoption of form No. 1. The question is open for further discussion if any one wishes to make any further remarks.

Mr. Brown—The reason for adapting the rounded edge to the base, as in No. 1, is that it does not cut into the spike.

Mr. Coleman was here called to the chair.

Mr. Burnett—The question arises, is it a heavier rail or better one, or both, that is required? Certainly a better one is needed, but do we want a heavier one? If a 70 lb. rail batters as quickly at the end as a 60 lb. rail, then what is the advantage? Here are two joints, one of 1866 steel, one of 1868 steel, both laid on the Rock Island Road in corresponding years. I had these joints cut intact without removing the fish plates as they now appear. They both have worn under the traffic of the Rock Island since their respective dates, and from a single track from 1866 until 1878; since which time the second track has been in use; and there are to-day 23 passenger trains a day passing over these rails, besides the freight traffic, from 3,000,000 to 5,000,000 tons a year. The question arises then: If you have a heavier rail, don't you want a better one than you have now? I do not think that any man can show a 70 lb. rail in use five years—since 1879—that will equal these two joints in wear since 1866 and 1868.

On motion of Mr. Brown, the general form of the rail, without regard to weight, represented as "No. 1" on the diagram, was recommended by a rising vote of 47 to 6.

Mr. Burnett returned to the chair.

THE CHAIR—The next point for consideration is the question of joints, which is the last clause in the committee's report, and reads as follows:

"3. *Joint.*—Your committee do not feel prepared as yet to recommend a joint. The double angle splice makes a superior joint, but inasmuch as this subject is at present receiving considerable attention in railroad circles, and as there are good forms of joint which merit attention, they would recommend that it be discussed and continued to the next meeting."

On motion of Mr. Pearson, by a rising vote of 45 to 7, the report was received, the committee discharged, and the report carried over to the next meeting for further consideration.

On motion of Mr. McInarna, it was voted that the question of joints be discussed at this meeting, subject to the above motion to carry over to the next meeting.

MR. MCINARNA—The best rail joint is that which supports the ends of the rails on the same principle of the one invented by Mr. Clark Fisher. It forms a bridge across two ties laid six inches apart in the clear, and the rails are fastened to it by means of a U ("U") bolt that holds them in place and prevents them from working up and down under every passing wheel, which is so injurious to the ends of the rails, as by constant wear they become bruised, which causes a pounding of the wheels and renders it impossible to keep the joint up in proper surface. The result of this is, that the rails have to be removed and disposed of as scrap, or laid upon sidings, while they are yet good and would last several years longer if the ends had not been injured on account of the defective joint fastenings. This is the result wherever the suspension joint with the angle splice is used. I find that it is better in all cases where common fish plates or angle bars are used, to put the joint upon a tie, which I think remedies the evil to a great extent. My experience with the angle splice is where we put the joint between two ties with 8½ inches in the clear, just as soon as the bolts become a little loose, the rail will wear up and down and sink into the ties, and by that constant wearing up and down under every passing wheel they become worn—worn about an inch and one-half or two inches from the end of the rail. You will find that to be the case in every case where the rails are laid and there is a reasonable amount of tonnage running over them, and that within two years after they are put down; you will also find that the side tie next to the end of the rail is worn more than the other side of it, and for this reason I would recommend that the joint be put upon a tie. I am experimenting somewhat now by putting two ties together, and putting the joint in the center of one tie and putting the other next to it, that enables me to spike the slots, which prevents the creeping of the track. My objection to that, at first, was I feared I could not tamp the ties sufficiently to give the joint proper support, but I found we could do that as well with straight tamping bars, tamping from the end, which in the fall or spring of the year is preferable to tamping with the tamping-pick—you can tamp under the center of the tie without disturbing the road-bed, and it is less work.

I also find that wherever the angle splice is used, that in two or three years they become bent, even if the rails are not worn. If the joint becomes a little low the top of it gets worn off, so that when you raise your joint (when low) the splice will break in every case from the top. That accounts for the breakage of angle bars, they become broken from the top, always, and in all cases, even where they are not broken; if the angle splice appears perfectly good, you will find you cannot raise the joint, and yet there will be a slight depression at the end of the rails, and upon examination it will be found that the splice is bent, and a new one has to be put in.

The Chair—Mr. Riley, have you not laid those 40 inch bars, angle splices?

Mr. W. Riley—C. & A.—We have laid some 36 inch angle splices; our experience with them has been very limited, however, although I think they are an improvement on the shorter angle splice, for the reason that the joint is supported by three ties instead of one or two, as with the shorter splices.

The Chair—Are those angle bars all of a size from one end to the other, or reinforced in the center?

Mr. Riley—They are all of a size; they do not taper; they are made with a heavy splice on the outside and a lighter one on the inside, with slots through the splice instead of cutting into the side. We have had those splices in since last spring.

Mr. McInarna—Do you allow the same space between the ties that the 22 inch splice has now, and is it not more liable to bend than the 22 inch plate?

Mr. Riley—No, sir; I do not use them; it has the support of all three ties.

Mr. McInarna—Well, without the three ties, with the same junction that the short splice has?

Mr. Riley—Your ties would have to be placed farther apart.

Mr. Pearson—I would move, now, that it is the sense of this meeting that the angle splice, or bar, is the best splice.

Seconded and carried unanimously by a rising vote.

Mr. Pearson—I would move that it is the sense of this meeting that a suspended joint is the best, (seconded,) and with this motion before the house I think it is best to proceed with the discussion, and after the discussion is completed, call for the vote.

I think the suspended joint is the best, because we get more timber under our track, and if the ties are close enough to be readily tamped, we get practically a width of two ties under the joint. On the railroad I am connected with, we have found that where we put the joint on top of the tie, the south end of the north rail will work about ½ inch deeper into the tie than the north end of the south rail, hence I have been of the opinion that the supended joint is the best on account of wear, and because we get more timber under the track.

MR. WM. DUNN—B. & O.—*Mr. President and Gentlemen:* As is i the first time I have met this association, and there is it one face with which I am familiar, I came more to hear than be heard; but I will give you my experience upon the ques- on of joints. It is that a heavier bar is required than is now n use, and a longer bar; one, say 42 inches long; then put a good ubstantial cross tie under the joint, and a good tie on each side with eight inches of space between; then with good ballast and plenty of it, well tamped under, and well drained, will give a better joint than the present style of joint fastening. I have tried the above, and find after six months' trial, there is no sign of the short dip in the joints that is so plainly visible in track put down the usual way with angle bars and with a suspension joint. I am satisfied with a 42 inch angle bar that will reach over three ties, and a good substantial tie under the joint, and the guard ties the proper distance and plenty of ballast, and then plenty of bone and muscle. The joints of a road depends in a great measure upon the watchfulness of the roadmaster. A good roadmaster, one who has good control of his men, with the proper amount of material, and plenty of bone and muscle rightly applied, will have a good road, with his joints all set firm and well drained. But no joint now in use will stand the heavy strain of fifty ton engines at fifty miles per hour without the utmost care on part of the section men. I find one great trouble with joints is that section men neglect to keep the bolts tight; the joint then becomes loose, and that great death rattle comes on to annoy the superintendent, who never fails to punch the roadmaster about it at all times. My motto is: a good tie under the center of the joint, a strong splice bar on each side, well bolted up, plenty of good gravel ballast, and plenty of bone and muscle.

MR. JONES—My experience has been that a tie under a joint is what helps to keep up the joint; three ties in all, with the splice-bars, whether the Fish plate or angle-bar is the proper thing; and if you have plenty of muscle, as Mr. Dunn remarks, it is no work to keep them up.

MR. TOMPKINS—I found two years ago that wherever the rail is pretty well worn at the suspension joint they went down and it is almost impossible to keep them up, and section men have gone over the road three or four times a month to try and repair these joints, and I finally put a solid tie square under these joints and that kept them up, and that teaches me that a tie under the joint makes the best joint. When you have a new rail it makes a nice joint to have a suspension joint, but it will not stand the wear.

Mr. Coleman—I have had some experience with both the supported and suspension joint, more so with the latter in mud, rock and gravel, and Mr. Dunn of the B. & O. road perhaps expresses my ideas better than I could myself. I think the supporting joint is far better than the suspension joint.

Mr. Doyle—I think the suspension joint is the coming joint, but I think it is a waste of material to have it too long. There are a good many places where I would put a tie under the joint with the angle-bar, but if you could get the right kind of a joint suspended, that is the joint we are after. If you use the Fish plate the gentleman from the B. & O. speaks of, I would say, put the tie under the joint; but if you buy a large amount of iron suspend it.

The Chair—What benefit would you derive from the suspended joint?

Mr. Doyle—I do not think you would get the jar you now have on the joint. I agree with the gentleman from the B. & O. that the angle-bar will dip on new soil in six months or so, but the suspension joint will be improved, I think, until it is *the* joint.

Mr. McInarna—In regard to the extra length of the angle-splice I agree with Mr. Doyle. I think it is a waste of material. I think this kind of a splice has given better satisfaction up to the present time than the angle-splice has. All the merit derived from the angle-splice is in its strength. We had many of those splices broken when we had iron rails. There are many good features connected with the angle-splice, but then as soon as the plates get loose, the weight is not upon the splice but upon the rail, consequently your rail will bed itself into the tie while your splice raises on top, on the tie outside, and curls outward toward the bottom, the only thing holding them in place being the spikes. Increase the length of the splice to 44 inches and you have more of that curling than with a length of 22 inches, and with the latter length you have equally as good results in putting a tie under the joints.

MR. LYNCH—I have had some experience with this joint. We are using on our road a 24 inch angle-bar with the suspended joint, 8 inches between the ties; the 24 inch bar covers two ties, and there is only four inches of that tie to carry it. The question is how to have an angle-bar sufficiently strong to prevent this dipping. Some time ago circulars were sent out in our division—there had been many angle-bars broken—calling for a report as to how many were broken in each division, and how. The question was asked in order to determine what we call "breakage." The effect of the decision, which was based upon the information we received, was to increase the weight of the angle-bar, and the weight was increased from about 14 to 17 pounds; the bar weighs about 34 pounds now. This change was caused by reason of the heavy locomotives we are using. I think that there is no question—there is none with me—as to the suspended joint, although I believe Mr. Dunn of the B. & O. makes a strong joint with three ties, and I think it can be done, provided you have a spliced bar sufficiently strong to carry it. The angle-bar has the advantage of the flange outside of the rail, which supports the rail, but if the plates get loose it has no support. If your angle-bar is properly fitted they support the rail if the bolt is not tight at all. Each of your quarter ties has a spike in the angle-bar which keeps it to its place, and of course it is better to be bolted tight, but the angle-bar fits up under the head of rail. The principal question to be considered with the suspended joint is the weight of the angle-bar; it must be strong enough to carry it over eight inches.

MR. JORDAN—On seventeen miles of track on the Canada Southern railroad this last spring we used the 44 inch splice, therefore I have had some experience with them. We had two shoulder ties and a tie under the joint; these we spiked, and so far we are very much pleased with them. I think they will hold much better than the short angle-bar or the straight splice, but this is only an experience of about six months.

MR. PEARSON—As I said before about this long joint, I should like to amend my own motion—I think I have the right—and put it in this way: that the suspended joint is the best joint where the ordinary length of plate used is twenty-two inches; and that for plates not exceeding twenty-four inches long the suspended joint is the best joint.

Mr. Dunn—The question comes up, as I understand it, as to whether the angle-joint is the best, and it has not been decided what length is the best. I take it for granted that the 40 or 44 inch length is the best, and that the tie under the joint should be put in in connection with the 40 or 44 inch angle-bar. It is to get the best form of joint with the application of the angle-plate. Then, if I am in order, I would offer an amendment to Mr Pearson's motion that it is the sense of this meeting that the length of the angle-joint should be long enough to reach three ties, with a tie immediately under the center.

Mr. Pearson—I accept that.

Mr. Kane—May I ask the gentleman what road he comes from?

Mr. Dunn—From the Baltimore & Ohio.

Mr. Kane—Is your road in the hands of a receiver?

Mr. Dunn—Not by any manner of means, and I do not think it ever will be, with our debts paid and $47,000,000 in the surplus fund, and not a dollar of stock for sale. (Applause.)

Mr. Kane—Well, that accounts, then, for the size of the splice. (Laughter.)

Mr. Pearson's motion, as amended by Mr. Dunn, to-wit: that the angle-bar should be long enough to reach three ties, with a tie immediately under the center, is the best joint, was put and carried.

On motion it was decided to accept the invitation of the C. R. I. & P. R. R. to go to South Chicago and Pullman; also, on motion of Mr. Pearson, it was voted to accept the invitations of the C. B. & Q. and C. R. I. & P. R. R's., to go on those excursions only upon the completion of the business before the convention.

Adjourned until 2 o'clock p. m.

AFTERNOON SESSION.

Thursday, Oct. 15, 1885.

The convention was called to order at 2:30 p. m., President Burnett in the chair.

The Chair—On railway switches the committee has made no report and yesterday asked for further time which was granted.

I understand the committee is not here, but the question in connection with the report would be as follows: I will read them:

"1. What is the best length for a point or split switch, and what should be the clearance for a flange-way at the heel or at the last spiking point?

"2. Is a point or split switch with a rigid rod connecting with the lever preferable to one with a spring?

"3. What is the best throw for a split switch?

"4. How does a split switch compare with the Wharton and other switches, so called safety switches?

JOHN SLOAN,
H. D. HANOVER,
J. B. MALL,
Committee."

In taking up these questions the inclination seems to have been, "get rid of them." There is this idea: "Let us carry it over to the next meeting; take it up next year, and thus make the matter as perfect as possible." This is all wrong in my opinion, from the very fact that the same questions we have to carry over to the next meeting we have carried along for three years. We should arrive at some decision in these cases. The same questions have existed for years and there has nothing definite been accomplished. Now in this matter of the split-switch, I should like to hear it thoroughly discussed and get all the information we can, and place some definite decision on record; let us go on record, right or wrong, and decide some of these questions. I hope every one will take an interest, and when we arouse a little enthusiasm and become in earnest there will be plenty of members here who can talk and who will talk. I would ask Mr. Sloan, as chairman of the committee, what he has to say in regard to the question of switches?

MR. JOHN SLOAN—Mr. President: Yesterday was the first I knew of my appointment on this committee. A letter, I understand, was sent me, but I did not receive that letter, and I would respectfully ask that a motion be made to the effect that all the members take part in the discussion, that the committee be relieved, and that after the discussion put it to a vote, and thus relieve the committee from making a report. Of course, I cannot make a report so long as none of the other members of the committee are present. I received no notice of my appointment on the committee until yesterday.

It was moved and carried that the committee be relieved and that the question be taken up for discussion.

Mr. Dunn—This is the subject I did not come here to be heard on particularly. I may have a few crude ideas about it, however, and will remark that there is one thing which is carried out here to an extent entirely uncalled for. We are not all parliamentarians and we do not come here as members of congress. A man should not be "sat down upon" because he does not come up to parliamentary rules.

It has been our experience that a 15 foot point split switch suits our road the best. We make the opening 4½ inches. The opening at the heel where we place the first spike is governed a good deal by circumstances; it is governed a good deal by the distance from the point of the rail where we are compelled to set the frog. The angle is made to suit the length. We do not pretend to make all frogs alike, because we cannot. We find that we must make special frogs. We spike that point where it will conform to the proper curve; that is about the only rule we have for that which we call common sense—conforming to a nice, easy curve, and spike the heel of the rail so that it will meet with the curve, and we have an easy switch and a good throw without any trouble. We spike the heel of the switch to conform to the curve we are compelled to make. I have nothing further to add on that point.

Mr. Jones—We use split-switches. We did use a 15 foot point. We make all of our split-switches at Beardstown, and make a 13½ foot point because a 27 foot rail makes two points. We spike our curves the same as our B. & O. brother, Mr. Dunn, does his. Our throw is 4½ inches.

Mr. Dunn—Just on the same principle as we make a 15 foot point. We take a 30 foot rail and make two, 15 feet long.

Mr. Campbell—The only difference between myself and these two gentlemen in this regard is that we use a 15 foot point, and when it becomes battered we cut it off and make a 13 foot point and use it on the side track.

Mr. Hayward—We use split-switches on all our main lines. We take a 30 foot rail and cut it and make two, 15 foot long each. We use ten small chairs and one head chair. The small chairs are bolted to the main rail. The shape of the chair is seven inches in width, with a curve so that they move right on the tongue; it comes right in the chair and forms under the head of the rail something similar to the Fish plate with a bolt coming through bolting it to the track, with four spike-holes in it, and it is spiked to the ties.

The Chair—What form of connection rod do you use with a split-switch?

Mr. Hayward—A flat connecting rod and attach it to the neck of the rail, two lugs coming up and bolting on the neck of the rail, not upon the flange. The switch stands directly in line of the center of the tie.

The Chair—Do you think that is the proper thing to do?

Mr. Hayward—Yes, sir; that is the way we have been doing, and it works well.

The Chair—Do you think it is equally as safe, or safer?

Mr. Hayward—Safer, in my opinion to attach the rod to the neck of the rail. First it was connected with the flange, but the friction made the holes in the rails larger, and now, in this way, they keep tight longer.

The Chair—How many rods do you use?

Mr. Hayward—Four center rods and the connecting rod. There is no difference in the switch except the chairs.

The Chair—On the 15-foot switch-point, what is the rule for placing the rods—have you any regular plan?

Mr. Hayward—We place them about three feet apart.

Mr. John Sloan—We use on our road the split-switch. The throw is 4½ inches; 15 foot points, I prefer them.

The Chair—How many side-plates do you use?

Mr. John Sloan—Twelve, six on a side. Side-plates are wrought iron and the rods are connected with the flange of the rail. We have four rods, and on some of the switches five; we are putting five on all of them now.

The Chair—About what is the life of a split-switch on your road?

Mr. John Sloan—They have been used five years and very few of them show any wear yet; of course the rail wears in proportion to the other rails.

Mr. Coleman here took the chair.

Mr. McInarna—We use the split-switch altogether on our road and have been using them for the last twelve years and they have given entire satisfaction. The split switch when properly made and properly put in is the best and safest switch now in use to my mind, but it is a very dangerous one if not properly put in, therefore great care should be taken to instruct the foreman in charge of them.

The length of the switch-rail varies upon different roads, and I think it would be better to adopt some standard length, which should be arranged according to the length of the lead, and that of the toe of the frog used, so as to avoid cutting more than one rail in the main track when putting in a switch. I am in favor of using a one to ten frog 15 feet long if a spring-rail, and a switch-rail 18 feet long. This will give a lead 85½ feet long, which is a practical length.

Mr. Burnett—Have you ever had any derailment from the point of the switch becoming loose, not fitting closely to the track and the wheel taking the wrong side?

Mr McInarna—Yes, sir; wherever there is play in the bolt-holes in the switch-rods, and then the men will throw the switch all right and lock it, and if there is snow or any other obstruction there, the point of the rail will not be close enough to the shoulder of the rail to admit a wheel to pass safely over it, especially where we use the spring connecting rod, and we use both, the latter mostly in the yards where the men can attend to them. We attach the switch-rods to the shoulder at the neck. In fastening them we drill two holes through the neck of the rail. We have never had any broken points. I do not think there is any danger to be feared from the fact that the wheel rests on the shoulder of the rail when it gets to the rods, and, another thing, the bolts we use fill the holes completely and there is no play there. I have never been in favor of the spring connecting rod on my own account.

Mr. Burnett—How many of these solid plates do you use to the switch-rail?

Mr. McInarna—Eighteen to the switch, nine on each side.

Mr. Dunn—The split-switch with us we think safe; we think the split-switch properly put in, is not dangerous, but we use the spring connecting rod, and we have it arranged so that no man can close that switch unless the rail is tight up, and if there is any obstruction between the point and main rail that switch-lever cannot be closed and locked until it is taken out; but Mr. President, any switch is dangerous if not properly put in—the split switch, the Wharton switch, or the stub switch. They should be taken care of after they are put in. I have found more accidents caused from careless men than from any fault of the switch, and I think the split switch, properly put in and properly taken care of, is absolutely safe. We put ten ties under the 15 foot point, and a solid plate on every tie, on each side. We raise the point of the switch in about the same manner as Mr. McInarna describes; we do it by having our plates run a uniform grade, and I will add, as I begun, that for safety we consider the split switch *the* switch.

MR. BURNETT—Mr. Sloan, I understood you to say you never cut a rail to put in a split switch?

MR. JOHN SLOAN—Exactly; I do not think it is necessary.

MR. BURNETT—While it is a little out of the order of things, I would ask, how do you make your excuse for not doing this?

MR. JOHN SLOAN—It is not necessary, I think. Our lead with a 15 foot rail is 79 feet and 4 inches. We throw out the rail at the end; drop in the frog and connect our point and that is all that is to be done, and I think it is unnecessary to cut the rail at all to put in a switch.

MR. ADAMSON—I have put in several switches this year, 15 feet switch rails, 4½ inches throw, 3 inches at the heel. I have some 77 and 84 foot leads, and one works as well as the other. We use the Wharton split switch. The points come ground. We put in the one-fourth inch plates.

MR. LOVELL—Our standard length is 18 feet. It was a question in my mind whether it was the proper length. I was inclined to favor 15 feet, and have ascertained from gentlemen using 15 feet that some prefer 18 feet; we use 18 feet.

MR. BURNETT—The question is, what should be the clearance for a flange at the heel, or last spiking point—that is, the distance between the main track rail and the heel of your switch-rail?

MR. JORDAN—We use split-switches altogether on the Michigan Central; we use a fifteen-foot point. We have the heels of our point 5¼ inches, and gauge the main track rail to the point. We use the one to eleven frog and two 30-foot rails, making a lead of 80 feet and 2 inches. We use a cast iron brace on the outside of our switches, and a sort of forked switch-rod for the three short rods. We had trouble with some, the bolts became worn, and in a short time the point did not fit closely to the shoulde We took them all up and made a switch-rod much heavier an so arranged it with the flange to fit up against the shoulder the main connection, so that when you pull the switch over th strain is not on the bolt, it is on the flange of the rail, and whe you close your switch it is the same on the opposite side. It i impossible for one man to close the switch when there is an thing between the point, snow or ice, or whatever it is.

• THE CHAIR—Do you believe the split-switch, from your expe rience is as safe as any, when properly taken care of?

MR. JORDAN—I do.

THE CHAIR—You spoke of the throw of your switch—ho much is it?

MR. JORDAN—Five inches.

MR. RAYNOR—On the Grand Trunk road we use the Wharto switch and it works nicely. It throws five inches; it has a on in ten frog.

THE CHAIR—I should like to hear from some gentleman wh does not like a split-switch.

MR. KANE—I am afraid there are not a great many of the here—the B. & O. has "knocked them all out of time."

The drawing of switch rods on black-board was here e plained. Those connecting with the flange of the rail and th neck.

THE CHAIR—If there are any gentlemen in the room who us that style of a "T" rod connecting with the neck of rail, a shown on the board, I should like to have him stand up?

(Ten of the members stood up.)

MR. MCINARNA—I have been using both kinds, and in all cas we find that those connecting with the neck of the rail are t safest.

MR. DOYLE—I think we are pretty nearly all in favor of split switch, and I move that it be the sense of this meeting th split-switch, 15 foot points, is a safe and economical switch; will make a motion to adopt it and recommend the use of it.

Motion seconded and carried unanimously.

THE CHAIR—The next question is, "is the split-switch wi a rigid rod connecting with a lever, preferable to one with spring?"

Mr. Kane—I think a spring rod is preferable for certain rea-ns; they will run through a switch, even if it is a stub-switch, d of course that "gives a man away," but you can throw that itch and you know there is a penalty attached to it. The lit-switch is called "the safety switch," and with it you must ve something attached to it to make it so, something attached the rod, something that will not let you on to the ground, a od spring connection, to make it safe, and then you cannot et off.

The Chair—Do you use a spring adjustable to both tracks?

Mr. Kane—Yes, sir; to both side and main track. You can ither use it in the shape of the flat steel spring by making it in he letter "S" or a spiral spring at the foot of your lever, attaching it to any stand in the United States.

Mr. Adams—The only thing against a spring or rod is the chance of leaving the rail open a little; I never had it occur, but it might occur. While the spring has all the other advantages for safety of life and property, that might occur from neglect on the part of the employe, which the superior officer is never to blame for, you know.

Mr. Dunn—I will say that one of the worst accidents we ever had on the B. & O. road, happened from a spring in a split switch; it was a stormy night and probably six or eight inches of snow on the ground. A freight train ran in and took the side track. The man who closed the switch was nearly frozen to death, but he threw that switch over, and in throwing it over it was supposed the snow fell in. He closed the switch up and locked it; a passenger train ran along at the rate of 35 or 40 miles an hour and ran into it; times were lively there for a few moments, and while it did not kill anybody, it frightened them, and destroyed $10,000 worth of property. That very thing condemned the spring in connection with a switch on the whole length of the road, and it was thrown out.

Mr. Adamson—You will see by the carelessness of that brakeman on the B. & O. road, the switch was thrown away, while the man ought to have gone to the penitentiary. There was nobody hurt in that case, yet the switch was thrown away and the brakeman was kept at his work, no doubt.

Mr. Jones—My men report cases of this kind; and while you have a spring on your lever rod it leads trainmen to be careless and run through their split-switches, and no marks are shown and no report made of it. I believe that trainmen should not run through split-switches unless they are thrown. In every case, I would be in favor of the rigid rod for a lever rod; I think they are safer in every respect.

Mr. McInarna—I do not believe in anything which has any deception connected with it. We have had the spring connecting rod in use on our road for a number of years; we have had a good deal of trouble on account of snow and ice getting between the rails; the orders given to the trainmen are very strict; the intention is to be very strict with them, and any man who runs through a switch without throwing it, whether there is a spring connecting rod on it, or rigid, that man is discharged. I believe in having a switch so fixed that there can be no deception, and so that it will not show itself to be in place when it is out of place.

Mr. Jones—If a trainman runs through a switch with a rigid connecting rod, he will go to the office and report it before he leaves the station.

Mr. Kane—Not always.

Mr. Jones—99 times out of 100.

Mr. Kane—A safety switch and careful trainmen are different things. Have a spring rod, the spring connection so that you can run through without breaking, in case you have to do it. Any of you gentlemen who have ever handled trains will know about it, will know where you got in and could not get out; you have, no doubt, (to Mr. Dunn,) if you have the spring connecting rod in proper shape, it is all right. If men are careless, it is nothing against the rod or the switch. They know they can run through it and cannot get on the ground. With the stub-switch, they cannot do this. I do not see any objection to the spring connecting rod, while I do to the rigid rod. The lost motion can be taken up better with a spring rod than with the rigid. If they run through with the rigid rod, the rod or rail is broken and it must be renewed. It can sometimes be found out who does it, but that has nothing to do with the durability of the switch. Snow may get into any switch if it is not attended to; the trainmen should look to them.

Mr. Pearson—What is the objection to having the stiff rod? The Western Indiana R. R. Co. manipulates the whole business by a weight. You can run through it with perfect safety and not damage the switch, at the same time it is a stiff rod.

Mr. Lovell—We have both; the spring for one side and the rigid rod for the other. When the switch is thrown for the side track, a train coming down the main track allows it to spring back; when the spring is thrown over, the rigid part connects and springs it together against the main rail, just as your rigid rod.

Mr. Dunn—That, I think, removes just one-half the trouble, (laughter,) the other half remains.

Mr. Kane—Makes just one-half the safety switch—that is, on the side they use the spring. (Laughter.)

Mr. Dunn—I know of a case where a train ran through a split-switch with a rigid rod and they did not know it, and if it had not been for one of the section men going down to the switch for a lamp and there discovered it, a circus train would have run off and ditched. If a man can ride through a split-switch with the rigid rod and not know it, there should be some way to notify a man. In the case referred to the switch was turned over and the lamp out; they ran through there and did not know it; the engineer was a good man, too, and on the lookout.

Mr. Jordan—I have known of two cases where a passenger train went through a split-switch, and I do not know as they knew anything about it; they did not report it.

The Chair—Is there a fine on your road for running through a split-switch?

Mr. Jordan—No, sir; if they do not break the point.

Mr. Hayward—We use both the rigid and spring rods. We are not using a great many spring rods, only where passenger trains run slowly. I have known trains to run through with the rigid rods and not know of it, in several instances; an engineer at Council Bluffs pulled a freight train of 30 cars through a split-switch and did not know it. He bent the points but did not break the rod; a switch engine came along a few moments afterwards and tore up the track. There was some dispute as to who did the damage, and the facts were finally determined. The engineer said he never noticed it, but heard a little grinding when the train went over, but the train ran smoothly.

Another incident was at a junction; a freight train was in the side track, and backed out and up to the station, and allowed a train from the other road to go ahead of them, and in backing out the brakeman did not turn the switch, and the other train came down and ditched 14 cars. We have two or three instances on record where we have known of their running through with the spring on and not breaking the spring. There have been several cases of running through a rigid rod switch.

On motion of Mr. John Sloan, in order to get the sense of the association as to which was preferable, a spring connecting rod or a rigid connecting rod, a rising vote was taken, which resulted in 36 voting for a rigid rod, and 14 for a spring rod.

THE CHAIR—The next question is, "How does the split-switch compare with the Wharton and other so-called safety switches?"

MR. LOVELL—The Wharton switch has its commendable features and so does the split-switch, so that I will not make any remarks regarding it.

MR. LOFTUS—The only difference I can see between the Wharton switch and the split-switch is this: if you have anything wrong with the switch it requires a heavy car to move the Wharton, while the split-switch can be moved with a hand-car. I have used both.

MR. JONES—I move that it is the sense of this meeting that the split-switch is as safe as any other.

Seconded.

MR. PRESTON—I have used the two kinds of switches spoken of, and one other kind which I think is cheaper and safer than those.

THE CHAIR—The question stands for the split-switch against the Wharton or any other kind.

MR. PEARSON—I do not think you can consider the split-switch a safety switch at all. I do not think you can consider the switch which causes accidents a "safety switch." One of the worst accidents I ever knew occurred by reason of the split-switch which was made after the pattern used by the Pan Handle R. R. Co. with the spring connecting rod; it happened in this way: One end of the car went on the main track and the rear trucks took the side track. The switch had a spring in it made after the exact pattern used on the Pan Handle road. We have a safety apparatus near New Albany that I have actually set wrong on purpose, and run the engine with a passenger car at the rate of 30 miles an hour and went over it perfectly safe, not once but a dozen times. It is called the "Cook switch," and cost our company just $27. If the switch is set to the side track of course you must run into the side track, but the cars do not get off the rails with the Cook switch.

THE CHAIR—That is so with the split-switch, or with any other.

MR. PEARSON—Not always.

MR. PERRY—I will say this for the Wharton switch: we have them on our road that have been in for ten years, and they are good for forty years more (sensation and laughter), because they are not used only where you use the side track and they are perfectly safe, leaving the main track untouched.

MR. McINARNA—A few years ago, the Pitts. Ft. W. & C. R. R. adopted the Wharton switch, and commenced a little over a year ago to take them up and put in the split-switch, and that shows their decided preference for the split-switch over the Wharton, after a fair trial of the Wharton. At Mansfield, on their road, I know of two accidents they had caused by the Wharton switch.

MR. KANE—I maintain that the Wharton switch is not a switch at all. (Laughter.) You cannot use it unless you move some part of the main track rail, and as Mr. McInarna remarks, you arrange an unsafe and unnatural surface, you have to carry your engine over the top of the rail, and you are riding over a little cob-house bridge. There is no switch rail following the main track, and you must use the main track in order to get a switch.

MR. JONES—Are we discussing the merits of the Wharton switch, especially?

THE CHAIR—No, sir; the question is, how does the split-switch compare with the Wharton switch and other so-called safety switches.

MR. DUNN—I would just ask the gentleman who says, "The Wharton switch is not a switch," what road he represents?

MR. KANE—That is immaterial—that is my own opinion, and in that opinion I do not claim to represent any railroad; no railroad is responsible for it.

MR. DOYLE—When you talk about the safety switch, the

White switch beats any switch in the world; but it costs too much money, the royalty on it is $125.

A MEMBER—We have the White switch in our track; it has been in four years and has not cost us five cents for repairs.

MR. KANE—We have an Adams switch that has been in the track eleven years that has not cost us five cents.

A MEMBER—Should inventors of switches come here and express their ideas, or is this a meeting for roadmasters?

THE CHAIR—I do not know how he could be debarred for saying a word against, or in favor of a switch, in case he is a roadmaster. I do not know whom you refer to, and do not know of anyone who has an interest in a switch that has been speaking. However, there is a question before the house, and if you are ready for the question we would like to take the vote. It is moved and seconded that the split-switch is as safe as any other.

Motion of Mr. Jones put and carried.

THE CHAIR—The next question for consideration is the one in regard to gravel ballast, which I will read. (Read as follows:)

"Your committee upon gravel and cinder ballast would respectfully report as follows:

"1. Which is the better, gravel or cinder ballast?

"Opinion is very evenly divided, gravel having the preference except in yards; there cinder is considered preferable, your committee favoring the cinder for yards.

"2. Which is the cheapest method of handling gravel? Loading with steam shovel and unloading with plow, or loading and unloading by hand?

"Opinions vary, yet they seem to favor the steam shovel and plow. Your committee would recommend steam shovel for loading and plow for unloading.

"3. The cost of handling same. We find the average cost of handling to be as follows: Loading gravel with steam shovel from 6 to 10 cents per yard, and loading and unloading and putting the same under 20 to 24 cents per yard. For loading and unloading cinders 80 cents per car, putting under the track from 12 to 15 cents per yard extra.

JOHN DOYLE,
J. W. CRAIG,
Committee."

On motion the report was accepted and the committee discharged.

MR. DUNN—It is very evident where you are to ballast up any amount of road, the steam shovel is the cheapest to use. On a portion of the B. & O. R. R. we use the steam shovel. It costs us five and one-tenth cents per yard for unloading. We use the side-dump cars which are used on the road simply by train men. Perhaps one-half the gravel will come out, and then shake it up and it will all come out. We load it for eight and one-tenth cents per yard for from 5 to 25 miles of a haul; the longer the haul, of course, the more it costs. We can load and unload gravel for eight and four-tenths cents per yard for a 20 or 25 mile haul; that includes the wages of the trainmen, engineer, and all, also the engine supplies at $35 a day.

MR. JORDAN—I have here a record of 20,000 carloads of gravel in a bank averaging from 7 to 9 feet; cost per yard for loading gravel with steam shovel, 4½ cents per yard—this includes coal oil, waste, labor, and repairs on steam shovel and engine. The cost per yard for hauling 98 cars per day, 30 miles, 735 yards per day, two trains and crews, was 4 cents per yard, and this includes labor, only. The cost per yard for ballasting and trimming the track, 13.5 cents.

MR. BUHRER—I found it costs us 66 cents a carload for 9 yards to a car, 7½ cents per yard. It is the cost of hauling the train by local freight and does not require extra engine service. The cost of unloading was 8 cents a car, or one cent a yard, making a total cost of 8⅓ cents.

MR. JORDAN—We put on last summer all the car could haul, to haul 30 miles, and made up quite a number of carloads, and the cost averaged a trifle over 7½ yards to the car. I had no side-boards on the car, and as to cost of the train, I could not give that.

MR. CAMPBELL—Ballasting—For a season's work with a good pit, I prefer a steam excavator and ballast unloader. Ballast handled in that way, taking short and long hauls, costs us about $1 per car of 8 yards to the car. We haul from 30 to 35 cars of gravel to a train. We unload with ballast unloader, and it takes us on an average of about one minute to the car to stretch or load up our cable, pull off the gravel and take care of the cable.

MR. RAYNOR—I load and unload a good deal of gravel, and I find that loading and unloading by hand is the cheapest way. It costs me 60 cents a car to load it, and nothing to unload it the train men do it, and unload a train load of 22 cars in from 7 to 8 minutes,—but I cannot load it for less than 60 cents a car

Mr. Kane—Does he pay his train men anything?

The Chair—"Sixty cents a car load." Does that include th entire expense of the engine?

Mr. Raynor—No, sir; that is just the labor; add to that th expense of the engine and train crew.

The Chair—How many loads would you move in a day?

Mr. Raynor—Three trains a day and we had 23 cars in a train and had about 20 men, giving about three cars apiece. If loading by the day, they would not load two cars apiece. We hav but one engine hauling the cars.

Mr. Campbell—It cannot be ploughed off in 5 or 10 minutes

Mr. Raynor—No, I hardly think it can. Speaking of loading gravel at 60 cents a car, and the unloading, I cannot figure on that, as we pull it out on the regular trains and use dump cars.

Mr. McInarna—I think the train can be unloaded in 10 minutes. I have used the unloading plough, and from the time that we undertook to stop the train to unload until we are ready with the cable wound up, we have often unloaded a train of 17 cars in 17 or 18 minutes, and it has never consumed more than 20 minutes for a train of 25 cars from the stop. My experience in loading is that it costs about 7 cents a yard, 8 yards to the car.

Mr. Galarneau—If you once get your cable ready you can plough off a train in five minutes, but the time is lost in putting the cable on and getting ready, and the nearest I can come to it is that it will require from 20 to 25 minutes. I have unloaded from 15 to 20 cars in 10 and 12 minutes, respectively.

The Chair—The question is, which is the cheapest, to load with steam shovel, unload by plough, or by hand? We do not care so particularly as to the time, nor are we trying the merits of th plough; the cost is the main question, and I think you are speaking too much of the merits of the plough and the time required

I will say, I have loaded this year with a steam shovel 4,80 car loads. I worked at that in May, 17 days; in June, 5 days in July, 24.5 days; in August, 14 days, and this was with th steam shovel; and unloading with ballast unloader, we used 3 ft. flats and 12 in. side boards. [Statement opposite page.]

STATEMENT OF MR. BURNETT.

MONTH.	Number of days.	Number cars loaded.	TIME LOST AND CAUSE.								Number days Labor.		COST OF				TOTAL COST.
			Waiting for cars.		Rain.		Fixing boiler.		Repairs track.								
			Hours.	Min.	Hours.	Min.	Hours.	Min.	Hours.	Min.	Moving shovel.	Loading gravel.	Moving shovel.	Loading gravel.	Unloading gravel.	Ballasting.	
May........	17	1479	36	10	4	....	....	....	....	....	....	272	....	463.70	208.33	276.41	948.44
June........	5	390	14	40	....	....	....	....	....	....	....	80	....	144 64	....	862.21	1006.86
July........	24½	1798	49	20	....	....	7	40	3	20	28¾	411¾	58.10	693.15	510.03	1013.90	2270.18
Aug........	14	1136	39	50	....	....	....	....	....	....	....	274½	....	541.80	....	537.92	1079.72
	60½	4803	Total time lost 155 hours, or 15½ days.								28¾	1038¼	58.10	1843.29	718.36	2690.44	5305 19

Engine service 121 days @ $10.00..$1210.00

Total..............$6515.19

Equal to $1.35+ per car for loading, unloading and putting under the track. Track finished in a first class manner. Shovel was idle 15½ days from causes shown.

Mr. Campbell—It is certainly the cheapest to use a shovel, if the shovel is a good shovel and you have a good blacksmith to keep it in repair. The shovel will work until it is broke, and the men won't work until they are broke. (Laughter, and a voice: "Sit down." He sat.)

Mr. McInarna—I would move that it is the sense of this meeting that the steam shovel is the cheapest method for loading gravel, and that the unloading by methods other than by hand labor is the cheapest.

Seconded and carried.

The Chair—"What is the cost of loading and unloading cinder for ballast," is the next question. Committee say 80 cents per car.

On motion the report of the committee was accepted.

On motion of Mr. Pearson the question of loading and unloading cinders was laid on the table.

The secretary read the report of the committee on rock ballast, as follows:

"Your committee beg leave to report as follows:

"We recommend that broken rock is the best material to be had for ballast.

"First—It forms a stronger bearing for ties than either sand or gravel.

Second—It affords better drainage for water.

Third—It does not require as many ties per mile.

Fourth—It stays in surface better and does not require to be overhauled as often.

Fifth—It is no more rigid than most kinds of gravel and rails; will wear as long as on other ballast.

R. A. Houghton,
Committee.

On motion of Mr. Pearson the report was received and the committee discharged.

Mr. Pearson—I move that it is the sense of this association that rock ballast is the best ballast for general purposes.

Seconded.

Mr. McInarna—My views upon rock ballast against other ballast are these: In the first place, you cannot have as smooth a track with rock ballast as with first-class gravel or cinder, from the fact that if you get the rocks broken properly, or to a certain size, unless your joint is low according to the size of your broken stone, you cannot tamp it. If your rock ballast is broken, say an inch in diameter, your joint must be one inch low before you can tamp it; on the other hand, with good gravel, you can raise the joint a quarter of an inch and have a much smoother track.

Another point in favor of first-class gravel is, when you come to maintain a good line upon the track and a portion of the track gets out of line, you throw it, one-half inch or inch, and the stone crushed in the bottom of the tie, and the track goes back the first train that goes over it. For cleanliness and to avoid dust, I am in favor of rock ballast; it is the cleanest ballast there is where there is much summer travel especially; it is superior to gravel on that account, for gravel makes a terrible dust. Rock ballast has all the elements that could be desired for drainage over the gravel, unless the gravel is very coarse; however, the best track that could be put up would be to use rock ballast for the bottom and three or four inches of gravel on top; the gravel would stay on top 8 or 10 years. What makes a good track is stability. If you get a bed uniform,—and that is done by raising up the weak places and securing a uniform bearing,—then you will have a good track and it should not be disturbed.

MR. BUHRER—Gravel ballast I consider better than rock ballast for the following reasons:

1st—For its elasticity.

2d—For its cheapness in handling.

3d—Low expense in repàirs to track.

4th—Low expense in cleaning track from weeds.

As to the first point, it is considered that gravel ballast rides smoother and easier than rock, and for this reason is less damaging to machinery, and less damaging to cross ties and rails, and particularly is this true on a line with large traffic. The rock ballast offers such a large and unyielding bearing that the ties are cut into by the rail, more especially so if the ties are not kept up to a true bearing or surface. I have seen ties on a line of heavy traffic with rock ballast cut to a depth of an inch and a half by the rail, while on another track of equal traffic, ballasted with gravel, the ties were damaged only slightly from this cause. This is explained from the unyielding nature of the stone ballast and difficulty in tamping pieces of rock ballast to a uniform solidity when you have the latter the size generally required.

Another feature perhaps it is well to mention, which is the noiselessness as compared with rock ballast, and I might further add that passengers generally consider gravel less tiresome.

2d—Cheapness.—Upon this point I wish to say that I ballasted 10 miles of track this season and kept an actual cost of loading and unloading on cars. The cost of loading at the pit, including stripping, was 66 cents per car load of 9 cars, or about 7⅓ cents per yard. The cost of hauling I kept no record of, as it was done by local freights, and did not require extra engine service. The cost for unloading was 8 cents per car or about one cent per yard, making the total cost delivered 8⅓ cents. Stone ballast alone delivered, I think costs in the neighborhood of $1.00 per yard. For a more striking comparison note that one mile of rock ballast track, 12 inches below the base of ties, would cost, at $1.00 per yard, $2,930.40, while gravel would cost, at 8⅓ cents per yard, only $240.24, making a difference in cost in favor of gravel of $2,690.16, in a distance of only one mile, and in 100 miles this amounts to the large sum of $269,016.00.

Therefore, is it not well for our railroad companies to consider the capital uselessly invested in using rock? I have not considered in this estimate the cost of putting this ballast in the track, but I find that it costs me $6.25 to raise the track about 4 inches and put in 63 yards of gravel, filling in and tamping and leveling the same up to a first-class condition, which is an average of about 10 cents per yard, or a total in track of 18⅓ cents.

3d—Low expense in repairs to track.—Careful account kept of the cost in surfacing and lining track on my division for one year was $139.00 per mile; on the division east of me it was $137.60 per mile. Our track was kept in good condition. I should like to hear from the advocates of rock ballast as to their cost of lining and surfacing track per mile,—not in the way of an estimate,—but actual figures. I would also add that the expense of taking out and replacing ties is much less in gravel than in rock ballast.

4th—Low expense in clearing track from weeds.—This is the expense for cutting, pulling, and digging out weeds between the ditch-lines, which are 7 feet from the rail on my division. I find the average expense on my division for this year up to Oct.

1st—all track cleaned—was $15.79 per mile. The track was kept fairly clean throughout the season, our officers requiring neatness and cleanliness in this particular. This average represents the labor of a foreman and four men, working a total of only 12¾ days in the whole year on this part of track repairs. I find that a section poorly ballasted cost as high as $25.09 per mile, while one with plenty of gravel cost me for one section at the rate of $12.99 per mile, and another $13.74 per mile, a difference of $12.09 in favor of plenty of ballast.

Mr. Houghton—I am a rock ballast man, myself, and I have never had more difficulty in surfacing rock than gravel. You can raise it ⅛ of an inch, or ¼, or 2 inches, whatever height required, and get just as good a surface, if you understand tamping. If the rock is properly tamped when put in, it will not get out of line any more than gravel. If you tamp the ties clear across as hard at the center of the tie as at the ends you will have trouble. We do not tamp our ties only from 12 to 15 inches inside of the rail, and outside of the rail to the end of the tie. We break them so the largest stone will go through a 3¼ inch ring, and in following that rule they average much less than two inches in thickness. If you break the stone in this manner the main part of it will be much smaller. The stone also break in tamping. One year we broke most of the stone with a crusher and found in doing that, without screening, too large a portion of it was sand, and after it became settled it was too solid. There is some gravel with sand that is more rigid than stone; and the gravel we use on the Wabash, I must say, after it has been in a few months, it is certainly as rigid as our stone ballast, and in the winter time has far greater rigidity. Our engineers understand that in the winter time the stone ballasted track is the easiest track to ride over,—of course there may be some places that may prove an exception. I have 10 miles of Cleveland steel rail, made in 1875, laid on sand ballasted ties, laid three or four years ago, and the breakage has been great, and the rails have been broken badly since we put in the stone on that same rail which before was on sand,—but I attribute that more particularly to the fact that in winter the sand freezes and makes it hard, while the broken stone would not freeze and protects the rail in winter, and the breakage with us is not heavy. From my observation I am convinced that the wear is not as great on rock as on gravel ballast, yet, if the track is equipped with as good a surface, I will admit that I do not see why there should be any difference. With our experience of 12 months there, I think the stone furnished the most elasticity. I know there is much opposition to this view, but those who use rock ballast I find do not condemn it on this account.

Mr. John F. Shea—Utica & Black River.—Until lately I have been of the opinion that there was nothing as good as rock, but we have 335 miles of road all ballasted with rock, except 40 miles, which is ballasted with gravel that we got out of the creeks on the line of the railroad, and we are so favorably impressed with the gravel ballast on that 40 miles of track that we are making an effort to get into a gravel pit to gravel the entire track. I put in 100,000 yards of rock ballast last summer and it cost between 80 and 90 cents a yard to get it into the road. We have not had much trouble with the track only in that which is ballasted with the rock, that is in the breaking of rails. When the rail or a joint gets down one-half or three-quarters of an inch you have a sudden kink, while with the gravel it is a pretty uniform and much easier surface.

Now, in changing the ties in gravel, one man can do as much as two in rock; he must take out the rock and make it deeper than the surface of his tie, while with gravel he can put it nearly in the same bed. That has been my experience, and I am only speaking from my own experience. Our company is endeavoring to secure a gravel pit to raise our road six inches. I find that we cannot get an exact surface bearing on rock, and the track stays in line better in the gravel than in the rock. Our rock costs a little more on account of having to haul it 50 or 60 miles. The cost of the rock, breaking and putting in, is in the neighborhood of 90 cents a yard. We quarry the rock; we do not contract for crushing.

Mr. Adams—We have two kinds of gravel—I am not much of a rock man. Give me a good section foreman, and plenty of muscle, and I can get up a better and nicer road and easier riding track in gravel than any of your stone ballast men.

Mr. Pearson—I will now give my experience. On the road I am on now we have several kinds of ballast; sand, clay, gravel, and stone. We have a grade of 40 feet to the mile and some sharp curves. On the lowest portions of the grades with sharp curves, we could not use gravel ballast well, as it would not be but a little while before the gravel would be washed away. I am of the opinion from my experience in these different kinds of ballast that rock ballast is the best ballast; the track, I think, keeps in line as well, and I do not see any necessity for having any low joints at all in the rock, and you can make the stone so fine as to be tamped within ⅛ of an inch, if necessary; the ties are kept dry; they last longer—and at the same time I think gravel ballast is the cheapest ballast to use on railroads. The rock ballast on our road costs 10 cents a yard laid on the car, $1.50 a car, and it is of good size and easily broken by the crusher or by hand. It costs 25 cents a yard broken by hand, while we take the rock as it is and it does not cost us anything. On one occasion we ballasted a mile as a matter of experiment; we filled in between the ties and about a foot outside of the ties, and it cost 57 cents a yard, the breaking of it, putting it into the track, and lining it complete. I think in our experience it has proved the best. We break the stones so as not to exceed 2¼ inches in thickness. I do not know of any good reason why you cannot work a rock crusher in the middle of the track as well as on a construction train. I had my rock distributed alongside of the railroad as it came from the quarry, and the men broke it there in the middle of the track. We got our rock broken for 57½ cents a yard.

MR. DUNN—My experience in rock ballast is that it is too expensive for general use. I find that we cannot put it under our tracks for less than $1.20 per yard. In the first place, it costs us 45 cents a yard laid on the car; the stone is of that nature that it costs us 35 cents a yard to break it, making a total of 80 cents a yard when it is alongside of the track ready to go in, and then getting that ballast into the track makes it cost us from $1.15 to $1.20 per yard, while we can put in gravel that will make a better track, for 25 cents per yard. The gravel we have answers as good a purpose as the stone does. It drains equally as well; the track keeps in surface as well, and we can handle the track, taking out and putting in the ties, about 50 per cent. cheaper than we can with stone ballast, and, therefore, we put in the gravel wherever we can.

Cries of "Question," "question!"

THE CHAIR—The question before the house is, which is the better ballast, rock or gravel? All in favor of rock ballast will arise.

(Only seven arose.)

All in favor of gravel ballast will please arise.

(All those remaining arose. (Cheers and laughter.)

THE CHAIR—It is nearly 6 o'clock. There are two questions more to consider; one, "the elevation of curves," and the other, "the best form and method of instructing men for foremanship." If you wish, I am ready to come here to-night and close up the work before we retire for the night. I think we can do it between 7:30 P. M. and the time I went to bed last night, at least, (laughter) and if not we can complete it to-morrow.

Adjourned until 7:30 P. M., evening.

EVENING SESSION.

The convention was called to order at 8:00 P. M., President Burnett in chair.

THE CHAIR—Ladies and gentlemen, the hour having arrived to which this meeting was adjourned, you will now come to order. It seems we have only one question left to discuss, to-wit: "The elevation of curves and gauge of track," and then our work is closed so far as the consideration of the reports of committees is concerned, after which will come the election of officers, and then we will be ready to adjourn.

MR. DOYLE—Mr. President, I move that a committee be appointed to draught a suitable set of resolutions on the death of our late associates and fellow members, Thos. White, of the Chicago & Alton, and P. J Callahan of the C. M. & St. P. Ry.'s

Motion seconded and carried, and the chair appointed Mr. John Doyle and Mr. James Sloan as the committee.

MR. COLEMAN--Mr. President, we have a little business to attend to here while the ladies are present that will interest them more than the regular routine business.

THE CHAIR—We would like to do anything to please the ladies.

MR. FRED. HILLS, of the Ajax Forge Co., (with a gold-headed ca in his hand.—While you have been in convention here, gentlemen, have been a sort of messenger boy! (A voice: "And you did your wo well, too.") The members, about seventy strong, said they wanted me to "cane you," President Burnett, in some way, for your faithful work, and the zeal and efficiency you have shown as president of this association. For a man of my peaceful and quiet disposition, this may seem like a very dangerous and unusual undertaking, but I am backed by seventy huge men—men of bone, brain and muscle; these men stand back of me, and, as Mayor Harrison said in his welcoming speech, "I recognize the power of these men;" and I do not dare to refuse to "cane you" in public, whether you like it, or not. Please accept this beautiful cane, and keep it as a remembrance, and prop, and stay for your declining years, and we only hope that this cane may stick to you the rest of your life, for it is accompanied by the sincere gratitude and best wishes of the donors, and that you will appreciate this present from the members of the Roadmasters' Association of America. (Loud applause, Mr. Hills handing to President Burnett an ebony cane, with gold head, elegantly carved, and bearing the inscription: "Presented by the Roadmasters' Association of America to President I. Burnett, 1885.")

MR. HILLS (continuing)—You are a large man, Mr. Burnett; now, there is a man here who is not so large (turning to Mr. John Sloan, secretary of the association,) I am not afraid of him, under the circumstances, although I have the same backing as in the case of President Burnett! Mr. John Sloan, if you will stand up now, I will meet you here or in the middle of the room, or anywhere, for I am going to serve you as I did Mr. Burnett. I am no speaker, and cannot adequately perform the task allotted to me by the members of this association; I have not the language to convey to you, as they have to me, their thanks and appreciation of the good work you have done, and the interest you have taken in the affairs of this organization; all I can do is to hand you this cane, with the thanks and very best wishes of all of the members of this association. (Loud applause. An ebony gold-headed, finely carved cane, bearing the inscription, "Presented by the Roadmasters' Association of America to Secretary John Sloan, 1885," was here handed to Mr. Sloan.)

MR. HILLS (turning to the members, and continuing)—Now, to the members of this association, one and all, I would say on the part of myself, as a private individual seeking information, I am thankful to you for all the courtesies you have shown me, and for the information you have imparted to me, and at any meeting wherever you may go, east or west, north or south, I will go and be your messenger boy. (Applause.)

MR. BURNETT—(Hesitating and about to speak)—

MR. COLEMAN—Look at it before you address the crowd; it may not suit you! (Laughter, and cane examined by Mr. Burnett.)

MR. BURNETT replied as follows:

Ladies and Gentlemen—There are times when silence is eloquence, when the voice is powerless to convey the thoughts that crowd each other for expression. This indeed is my situation. The beautiful as well as useful gift of the association, which has been presented in behalf of the organization by Mr. Hilis in such a happy manner, is indeed a surprise to me. The intrinsic value of the beautiful "staff," which is designed to assist me in descending the hill of life, is not the value of the present. It is the spirit which prompted my brethren of the association, which gives it the great value which I set upon it. It assures me that I have the approval of men of sterling worth; the good will of men whose friendship and acquaintance is a prize and an honor, and allow me to assure you that I will ever esteem it as a pledge of the continuance of the pleasant and fraternal relation existing between members of the association and myself.

The history of our association is not musty with age. In 1882, when the Roadmasters' Association was organized, I well remember that our numbers were indeed very few. Four out of the multitude only assisting in and composing the nucleus of the present prosperous organization. I take the liberty of mentioning their names: Mr. Stockwell, of the C. & N. W. Ry., Mr. Teirney, of the C. R. I. & P. Ry., a gentleman of the C. B. & Q. R. R. and myself. The effort to organize was not such as to be very encouraging, but we were determined. We persevered, and the result is as you see it to-night. The four have multiplied as it were, so that now we number two hundred and thirty-seven; it almost takes my breath away to say it. Think of it, two hundred and thirty-seven great big fellows (at least physically). We are combined; we have combined for a lawful and laudable purpose. Our meetings can only be procreative of good, not only beneficial to ourselves but the great public in whose cause and for whose interests we are laboring. The organization is composed of men who have at least in their charge the great commercial interests of this country. An organization of this kind brings together men of our ilk from all parts of it. A discussion of the various duties which devolve upon us can have but one effect, to make us all better able to perform the duties which devolve upon us.

It is true that considering the number of roadmasters in America with the number who are members of the association, that the comparison may not demonstrate that general interest in the association which men of your intelligence would justify the expectation of; yet remember that we were but "four," we now in about three years can count our numbers by the hundreds, so that the outlook is certainly encouraging. And that while I am not a prophet, nor the son of a prophet, I will venture a prophesy, that in three years from this day we will number our membership not by hundreds but by thousands.

Our organization has for its object a lawful and patriotic purpose. It is right, and it will succeed and triumph.

Again thanking you, gentlemen, for this beautiful gift, we will say no more about it until I can square accounts in like manner, I hope, with the entire association. I hope to be able to wear that cane to many meetings. (Applause.) I'll assure you the cane will be there if I am well and able to bring it. (Loud applause and cries of "Sloan," "Sloan.")

MR. JOHN SLOAN—*Mr. President, Ladies and Fellow Roadmasters:* I hardly know what to say, or how to express my thanks to you for your kindness towards me. I had little expected anything of this kind. I had only been in the association for one year previous to this meeting, having joined in Indianapolis one year ago. During that year, to be sure, I have done a great deal of work in the association in sending out letters and circulars to the different roadmasters all over the country, but, as I remarked before, I did not expect any reward of this kind, and I now thank you heartily for your courtesy towards me. (Cheers.)

MR. E. R. MILLS—Southern Central—I move that a vote of thanks be tendered to Mr. Fred. Hills for his politeness and for the many favors we have received at his hands while in convention here.

Seconded, and carried unanimously, with applause.

MR. JAMES SLOAN, of the committee appointed to prepare the resolutions on the death of Messrs. Callahan and White read the reports of the committee, as follows:

"WHEREAS, One of our members, Mr. P. J. Callahan, of the Chicago, Milwaukee & St. Paul Railway, at Tomah, Wis., has departed this life since our last annual meeting, be it

Resolved, That we desire to place on record our esteem and affection for our deceased brother, and our regret that his young and promising life has been so soon ended. He had developed at once into an active and useful member of this association, and his fine appearance, his practical and straightforward manner, and his agreeable personal characteristics united to make him a worthy associate, a well-loved comrade, and an honored man.

Resolved, That the secretary of this association be instructed to send copies of these resolutions to his family at Tomah, Wis., and to the Gen'l Manager of the Chicago, Milwaukee & St. Paul railway.

(Signed,) JAMES SLOAN,
JOHN DOYLE,
Committee."

"WHEREAS, Since our last gathering in annual convention, our brother, Mr. Thomas White, of the Chicago & Alton railroad, at Bloomington, Ill., has been removed from us by death, be it

Resolved, That in the death of brother White this association has lost an active, reliable and greatly respected member; the railway with which he was connected for a score of years, a skillful and faithful officer; his family a true and loving husband and father, and we, as individuals, a friend whom we admired and loved. We hereby place upon our records our esteem for his character and our sense of loss by his death.

Resolved, That the secretary of this association be instructed to send a copy of these resolutions to his widow, and also to the general manager of the Chicago & Alton railroad.

(Signed,) James Sloan,
John Doyle,
Committee.

On motion of Mr. Coleman, the above reports of the committee were accepted and the committee discharged.

The Chair—Gentlemen, I have here a letter from Mr. J. W. Craig, who is a roadmaster on the Charleston & Savannah railway, located at Charleston, S. C., which the secretary will read.

The letter was read, as follows, and ordered to be printed in the minutes of the meeting:

Charleston, S. C., October 3d, 1885.

To the Officers and Members of the Roadmasters' Association:

Gentlemen—It is with feelings of regret that I have to inform you that events of the past ten days have been of such a character as will prevent my attendance at the Chicago meeting on the 14th, 15th and 16th inst. It is needless for me to add that I had looked forward with much pleasure to the time of meeting you all on the 14th inst. In this I am disappointed by circumstances beyond my control. Though I am not with you to participate in the proceedings of our third annual meeting, I shall not lag in my efforts to do all in my power to promote the interests of the association.

Having first met with you, at Indianapolis, in your second annual meeting, being an entire stranger to you all, I shall ever appreciate the honor you conferred on me, on that occasion, by electing me your second vice-president. The department we represent is second to none in the line of railway service. You have the experience (not in theory) but in practice, as shown by the condition of the railways of the present day as compared to what they were fifteen and twenty years ago. Our association composed as it is, with the experience of from five to forty years, I hope the time is not far distant when our association will be the recognized authority on all subjects in the department we represent. Wishing you all a pleasant time and a safe return to your homes, I am,

Yours very truly, (Signed,) J. W. Craig.

The Chair—The question of the elevation of curves is now in order, but before we proceed with that, I have a letter from Mr. Charles Latimer of the N. Y. P. & O. R. R., which the secretary will read:

CLEVELAND, O., Oct. 10th, 1885.

To the President and Members of the Roadmasters' Association of America:

GENTLEMEN—You have again done me the honor of inviting me to be present at your annual convention, and say a word or two, but this time I must decline, inasmuch as I am too much occupied and have lately been too frequently called away to take the time now.

I feel a deep interest in your success and believe that your aims and objects are of great importance to the country generally; hence I trust that your meeting this year will be a good one and that they will grow in interest and importance every year.

I have examined with care the nine questions you present for discussion, and I am pleased to see that you have again and again brought forward the same questions. Why is this? It is because the differences of opinion are great, and you are striving for *excellence* and uniformity; but it would seem to me that you should at this meeting determine some of these questions. Every one of them are of prime *importance;* of so much importance, and they have occupied my attention so much and so constantly for these years that I must again, after re-examination since your last convention, give an opinion, which I have done and send herewith, to-wit:

Railway Switches.—There is nothing like a split switch for symmetry, safety, lightness and durability; with the improvements made lately, especially in planing, I must say that the split switch now used by the New York, Pennsylvania & Ohio railroad are unexcelled in the country.

Frogs.—Improvements made in spring frogs have proved to my satisfaction that they are not only safe, as far as any device is safe on a railroad, and will outlast from three to five rigid frogs, I know; and moreover they will ride without the slightest jar or jolt.

Elevation on Curve and Gauge of Track.—Here is a most important and vital matter, not yet understood nor properly practiced. I maintain now, as I have heretofore, one-half inch to a degree upon curves for sixty miles per hour is safe, and this has been proven after ten years of trial on the Atlantic & Great Western, or New York, Pennsylvania & Ohio railroad. One-half an inch to a degree was determined upon as a compromise for passenger and freight trains on the same track with standard gauge, four feet eight and one-half inches; that is, for thirty-two miles per hour, and it has proved safe for sixty miles per hour. If you put an inch elevation to suit the highest speed of passenger trains you surely will reduce the number of cars you can haul on freight trains, where the curve is on heavy grade. I could write more upon this subject, and much is needed, but I will say that now, inasmuch as the speed of passenger trains as well as of freight trains has been increased, I should increase the elevation to three-quarters of an inch to a degree, and in no case go beyond six inches elevation. When curves are more than eight degrees, which gives six inches elevation, reduce the speed of passenger trains on them to a perfectly safe speed.

It is supposed that because a car cants to the outside in going around a curve that it is unsafe; this is not necessarily true. The elevation of the curve may not be enough to counterbalance the cant of the car, and the car may be balanced improperly. This gives an unsafe feeling, but it is not necessarily unsafe.

Now as to widening the gauge on account of curves; I have never done it up to eight degrees. The play in the wheels of rolling stock should be sufficient. To make variations for different curves is, in my opinion, poor practice. The play of flanges on our road is three-quarters of an inch; on some it is one inch. This should be ample on curves up to eight degrees without widening. The gauge soon widens itself sufficiently in the wearing of the rail and oscillation, so that the question is how to keep gauge. The greater the play of wheels the greater the oscillation.

Leaving your other questions I come to handling coal for locomotives. This is a subject to which I have given considerable attention. The N. Y. P. & O. R. R. has established four coaling stations—one at Meadville and one at Leavittsburgh, both of the Kerr patent, so well known in Illinois, a most admirable device. These two are of forty pockets each, holding five tons when full. The time consumed in coaling is from one to three minutes and the cost per ton for labor four cents from the car to the tender.

We have a Burnett & Clifton chute at Silver Creek, on the western division of this road. The cost for handling coal is the same, four cents per ton for labor, each station handling 4,000 tons on an average per month, but the motion of coaling is more rapid. It is even possible for a train to keep in motion and dump a tender full of coal and withdraw the doors safely, so perfectly do the traps work. I prefer the Burnett & Clifton chute.

At Galion we have an elevated track dumping upon a platform and small cars on latter with scales and track. The coal is loaded by hand. The advantage claimed for this is that you get the exact weight of coal delivered to each engine. But whilst you attain this very important object the cost of handling the coal from the cars to the tender is increased and the advantage of weighing out is about lost by additional cost of handling. The cost of handling by platform and weighing must average at least two to four cents per ton more than the chute system.

The cost of the platform and elevated track uncovered is thirteen per cent. less than the Kerr or Burnett & Clifton chutes covered, the former costing $7,375, not covered, whilst the latter cost $8,500, sheeted, battoned and first class shingle roof. But in neither case should the platform or chute be uncovered. The platform and scale system is the Pennsylvania Railroad system and most certainly is inferior to the chute system. There is one other advantage in the platform system—more coa can be stored; but the proper way to do, although costly, is to build more chutes and store in them, up to one hundred pockets if necessary, or build storage platform along side of trestle and re-handle the coal through chutes, taking it up to the main chutes in cars; this will rarely be necessary. The cost of adding to a system of pockets will not exceed $75 per pocket, complete. Keep the men and coal covered from rain, snow and sleet. The coal is run upon the trestle into the chutes in cars of twenty tons, which dump on both sides.

The Clifton chutes are a perfect success and have nearly saved their value already, having been up not more than two years, and have effected an immense saving in the time of locomotives.

Mr. Dockstader, the master car builder of the N. Y. P. & O. R. R. has invented an arrangement for places where it will not pay to put in chutes, for coaling engines from a side dump car. This is admirable, and I forward a blue print for inspection. You can all honor a fellow workman's invention.

Handling coal for locomotives on railroads is one of the great economies, and I know of nothing which should more seriously engage the attention of railroad managers, and as our roadmasters should all aim to have a controlling hand some day, no question could have been more interesting and opportune than that of handling coal.

Many contend that the saving in coal effected by careful firing and emulation induced by charging the exact weight of coal to each engine is worth more than the amount saved by the chute system over the platform system, but it must be remembered that the coal can be measured in the pockets so as to give the proper weight by selecting an intelligent man to handle the chutes, who can tell how much coal in weight that he measures out, the whole advantage then is on the side of the chute. Unless the chutes are arranged for the whole road, or the platform, neither will give accurately the weight, hence the advantage of emulation in both cases.

Yours very truly, CHARLES LATIMER.

On motion of Mr. Jones, as many wished to start for their homes soon, the convention proceeded at once to the election of officers.

At the suggestion of Mr. Mills, Mr. John Sloan was called to the chair.

MR. MILLS—I move that the rules be suspended, and I also nominate our honored president, Mr. Isaac Burnett, as his own successor, and move that the secretary cast the ballot of the association for him as president for the ensuing year. (Applause.) I hope, gentlemen, that this motion will be carried in such a manner that it will be a compliment to Mr. Burnett for the zeal, ability and untiring energy he has shown for years in this work;

is certainly not only due to him, but in the interests of the ssociation to re-elect him to the last term he can occupy according to the by-laws.

Seconded by several.

By consent, the motion was amended and Mr. Burnett was re-elected unanimously by a rising vote, followed by hearty applause.

MR. BURNETT—Gentlemen, it is with regrets I assure you that I shall have to decline. While I know that there are others whc are more competent to fill this position, yet after all the kindnes you have shown me and this flattering vote and manifestation o your approval, I really do not like to do it. It is true that I hav worked for three years, and worked hard, and the fruits of thi labor is shown in the 235 members we have at present, when w had but four in the beginning. Many a night when you wer asleep, gentlemen, I was at work in the interests of the association. My extra postage stamp bill last year was $22.00, an every dollar used in the business of the association, and, now, I think I have done my part of the work,—the association is no on a good, firm footing,—and that you ought to excuse me fro serving any longer. (Hesitating—and a voice: "Oh! this thi is settled; you might just as well surrender"—laughter a applause.) I will say to you, gentlemen, if you will elect as yo president Mr. J. W. Craig, of Charleston, S. C., a young m full of energy and work, a good speaker, and a jolly good fell you will have a Southern influence, which you have not got n you could not get a stronger head than Mr. Craig, and with Coloman as vice-president, you will have an able team and n continue to grow and prosper.

Mr. Coleman took the chair.

MR. DUNN—I would move, Mr. President, that we c accept the resignation of our future president, Mr. Bu (Applause.)

Seconded.

THE CHAIR—(Mr. Coleman)—You have heard the mo all in favor of it will arise. (Every man arose to hi (Applause.)

MR. BURNETT—I came to this convention fully dete and promised my wife,—and that is a duty that I should that I would not, if called upon, act as president of the tion for another year. It would perhaps be a little ungentlemanly for me to resist after the very flattering re-election I have received. (A voice—"you can't.") I would ask how many of the men who stood up to-night and refused to accept my resignation will attend the next meeting? All that will attend the next meeting will please arise. (All arose.—A voice, "the same crowd.") (Applause.)

Well, gentlemen, if you will keep your promise with me, as well as I will mine with you, we will have a rousing meeting next year at St. Louis. I will accept. (Applause.)

For first vice-president, Messrs. Coleman, Mills, Craig of South Carolina, Mr. Doyle, and Mr. Pearson were nominated.

MR. BURNETT—I will say for Mr. Craig, he is a good man, so is Mr. Coleman, and so are Mr. Doyle and Mr. Pearson, and all nominated, for that matter, but you reside near Chicago, gentlemen, and Mr. Craig is down in the Southern country, and of all things we should have a representative down there, somebody to correspond with and do business with. We have but few members there, and there are many roadmasters in the South, and the roadmasters in the South, everyone we corresponded with, said, "Yes, we would be glad to be with you, and to see you succeed." While I am not electioneering for Mr. Craig, I know he is a good man, and I am working for the interests of the association.

The chair appointed Mr. Mills, Mr. Preston, Mr. Jones and Mr. Lockie as tellers, and the convention proceeded to ballot for first vice-president, and the ballot resulted as follows: Total number of votes cast, 62, of which Mr. J. W. Craig received 45; Mr. D. Coleman, 9; Mr. Jno. Doyle, 4; Mr. J. H. Pearson, 3; and Mr. E. R. Mills, 1.

THE CHAIR—I therefore declare that Mr. J. W. Craig, of Charleston, S. C., is elected first vice-president for the ensuing year. (Applause.)

Mr. Coleman was nominated by several as 2nd vice-president; Mr. Mills was also nominated, who declined, as he had nominated Mr. Coleman for the office, and on motion of Mr. Pearson the rules were suspended and Mr. Coleman was elected by a rising vote. (Applause.)

MR. JOHN SLOAN—The next thing in order is a speech from Mr. Coleman. (Cries of "Coleman.")

MR. COLEMAN—I am not prepared to do the subject justice; I am not an orator, nor have I been expecting any office at the hands of the association at the present time. I can simply say that I have not words to express my feelings towards you for the hearty manner in which you have elected me to this office, and in accepting it I shall endeavor to do a little more than I did last year, and the best I possibly can for the welfare of the association,—again I thank you for the honor, and for the manner in which you have conferred it upon me. (Applause.)

On motion of Mr. Jones, the rules were suspended and Mr. John Sloan was re-elected by acclamation,—which was confirmed and carried unanimously by a rising vote. (Applause and cries of "Sloan.")

MR. JOHN SLOAN—Mr. President and gentlemen of the association, last year I made an effort to decline to accept the position of secretary on account of the amount of labor that had to be performed. This year, for the first two months, I have worked from 6 o'clock in the evening until 12 and 1, and even 2 o'clock at night, writing and sending out letters and circulars to the different roadmasters and superintendents of the different railroads of the United States. It has required more time and labor for the last two months than I would have to perform in my own business, and during the last two weeks I have made the trip every night on the train in order to get this work done properly and get ready for this meeting, and I would rather that you would elect some one else as secretary. It is too much work for me to do, in addition to the amount of work I have to do,—at the same time I thank you very kindly for your courtesy in electing me for the second time, yet I would have preferred that you would elect some one else.

MR. BURNETT—Gentlemen, I would oppose accepting Mr. Sloan's modest declination on general principles, only I have stood this work for three years, and he certainly ought to stand it one year more if I do. I see no reason why he cannot do the work as well as anybody else; he is a strong, healthy, vigorous fellow, and a pretty good fellow, too, to have in that position. His line runs into Peoria and so does mine. (Laughter.)

MR. JNO. SLOAN—Yet I would be glad to have some one else do the work for a year. However, I will accept and do the best I can.

THE CHAIR—We have a member of the executive committee to elect. Mr. McDonald, of Escanaba, goes out.

On motion of Mr. Jones, Mr. E. R. Mills was elected as the member of the executive committee, and there being no other nominations the rules were suspended, and Mr. Mills was elected by acclamation. (Cries of "speech.")

MR. MILLS—I thank you for the honor you have conferred upon me, and shall do the work in the East for the Roadmasters' Association to the best of my abilty. (Applause.)

Mr. Burnett resumed thè chair, and on motion of Mr. Coleman Mr. Adamson was nominated for treasurer for the ensuing year, and there being no other nominations the rules were suspended and Mr. Adamson was elected unanimously by acclamation.

THE CHAIR—I understand that fortune has smiled upon Mr. J. H. McDonald; he has resigned the position of roadmaster and taken another position of honor and trust. He has been present at all our meetings; he has been a good member of the executive committee, and I think a vote of thanks for the valuable services he has rendered should be tendered him.

On motion of Mr. Doyle, a vote of thanks were extended to Mr. J. H. McDonald for his services for the past three years as a member of the executive committee. (Mr. McDonald was called for.)

MR. MCDONALD—Fellow Roadmasters: I thank you for the vote and the honor you have conferred upon me. I have retired from the railroad business, have resigned my position as roadmaster, and only wish you all could resign under like circumstances. My best wishes remain with you, and I shall ever have a regard for your welfare as an association. (Applause.)

MR. PEARSON—I should like to inquire how our finances are? We should like to know just a little something about it. We have not had a report from the treasurer.

Secretary Sloan read statement as follows:

Secretary's Statement of the Financial Condition of the Road Association of Americd, from Sept. 11, 1884, to Oct. 20, 188

1884.			
Sept.	11,	To cash in hand of Treasurer	$ 64.55
"	"	" 28 Membership Fees @ $2.50	70.00
"	"	" 14 Membership Dues @ $1.00	14.00
		Total Am't. in hand of Treasurer	
Sept.	11,	Paid "Railway Age" Publishing Bill	$ 27.55
"	"	" I. Burnett, Printing, stamps, etc.	31.80
"	"	To Benj. Weaver, Stenographer	40.00
		To Balance	
1885.			
Jan.	20,	Benj. Weaver, Stenographer, by draft	$46.25
Oct.	16,	I. Burnett, to balance due	2.50
		To Balance	

Receipts from Sept. 11, 1884, to Oct. 20, 1885.

To 42 Membership	Fees, 1884,	@	$1.00	$ 42.00
" 84 "	Dues, 1885,	@	2.50	210.00
" 35 "	Fees, 1885,	@	1.00	35.00
" 2 "	" 1886,	@	1.00	2.00
" 1 Copy of Meeting, 1884				1.00

1885.			
Jan.	15,	To Fees Remitted to E. B. Cushing	$ 2.50
"	"	" Printing and Stationary	8.50
"	"	" Express	3.30
"	"	" Postage Stamps	16.33
Oct.	15,	" Telegram to R. M. A., at Boston, Mass.	1.30
"	16,	" E. B. Grover, Exp. Acct. at Chicago	8.75
"	"	" I. Burnett, Exp. Train Crew	4.00
"	"	" I. Burnett, Stationary, Stamps, etc.	69.89
		To Balance in hands of Sec'y	
		To Balance in hands of Treas	
Oct.	20,	To Total Cash on hand	

JOHN SLO

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MR. PEARSON—While working on the subject of officers, I will say that I have on one or two occasions acted as secretary of similar organizations, and knowing something about the labor and the trouble to which the secretary is put—I will make the motion now that we authorize our secretary, if necessary, to employ additional help to make out his reports and do his clerical work for the next year and bring in a bill for the expense.

Seconded and carried unanimously.

THE CHAIR—Now in regard to our annual meeting; the question of the time for holding our annual meeting is a difficult one to settle. I have received a large number of letters saying: If the meeting was a month or two earlier, or later, it would seem to suit different ones. I can get away in August better than any month in the year. The place of meeting is another thing for us to consider. We do not want to look for a place of meeting for our pleasure by any means, but for a place most convenient and best suited for roadmasters to come to. Get the right place —and I think we hit the nail on the head when we came from Indianapolis to Chicago.

MR. MCINARNA—I think the month of October is the best time of year, from the fact that it is nearer the time when we complete our summer's work. In many places in the country the summer season is very short and we cannot get away sooner than October. I think the time selected for this meeting was a good one.

A MEMBER—I move we select the place of meeting and afterwards select the time we shall meet there.

It was so decided, and the following places were named for the annual meeting: Louisville, Ky.; Kansas City, Mo.; Cincinnati, Ohio; Detroit, Mich.; Washington, D. C.; St. Louis, Mo.; Denver, Col.; Cairo, Ill.; and Chicago, Ill.

MR. SHEA—I would suggest that we select either Louisville, St. Louis or Nashville, as the last meetings have been held in the northwest. I think it would be judicious in this association to make it as convenient for the members in the South as possible.

It was decided that the three places receiving the smallest number of votes should be dropped at each ballot, as there were so many places to be voted for. The first ballot resulted as follows: Total number of votes cast 83, of which St. Louis, Mo., received 30; Washington, D. C., 10; Louisville, Ky., 18; Chicago, Ill., 9; Kansas City, Mo., 5; Nashville, Tenn., 4; Cairo, Ill., 2; Detroit, Mich., 2; and Cincinnati, O., 1. No choice.

The second ballot was: Total number of votes cast 83, of which St. Louis, Mo., received 35; Kansas City, Mo., 13; Washington, D. C., 12; Louisville, Ky., 12; and Chicago, Ill., 12.

The third ballot was: Total number 83, of which St. Louis, Mo., received 59; and Kansas City, Mo., 24.

THE CHAIR—St. Louis, Mo., will be the place for our next meeting, having received a majority of the votes cast. Now it will be in order to determine the time for the meeting.

MR. PRESTON—I move that the next meeting be held the second Tuesday in October, 1886, the session to be Tuesday, Wednesday, Thursday and Friday, if necessary.

Seconded and carried unanimously.

THE CHAIR—The next annual meeting will be held in St. Louis, Mo., beginning on the second Tuesday of October, 1886.

MR. PEARSON—I would make one more motion, that the secretary and treasurer be authorized to have copies of the minutes of this meeting published in book form at as low a price as they can be obtained, and leave it to them to arrange for the publication.

THE CHAIR—The motion is, that the president and secretary be instructed to negotiate for the publication of the minutes of this meeting in pamphlet form at as good figures as they can get. Are you ready for the question? (Cries of "question!")

A voice—Without advertisement.

Motion put and carried unanimously.

On motion the secretary was instructed to send a copy of the proceedings, when published, to each member of the association.

Moved and carried, also, that all general superintendents of railroads having roadmasters belonging to this association be furnished with a copy.

On motion the invitation of the C. R. I. & P. R. R. to go to-morrow morning at 9:30 on the excursion to South Chicago and Pullman, was accepted.

Also the invitation of the C. B. & Q. was accepted, to leave at 3:00 P. M.

There were 59 who signified themselves as ready to go on the excursion in the morning, and it was thought a number not present would attend, a number having ladies with them.

For the C. B. & Q. excursion within the city limits, to return about 5:00 P. M., there were 46 present who voted that they would go.

THE CHAIR—The question of the elevation of curves still stares us in the face.

(Cries of "question!" "question!")

MR. PEARSON—I think the elevation should be one inch to the degree up to six degrees, and one-half an inch to a degree when above six, to nine degrees.

MR. DUNN—That is all very well, but if you put the curves in the hands of a section-master, how is he to find out what the degree of curvature is; for very few section-men know these things? I fully agree with Mr. Pearson that one inch to a degree is a good elevation up to six degrees, and one-half an inch after that up to nine degrees. But what is a very simple means of giving the desired elevation up to seven or eight degrees is to stretch a cord sixty feet long on the inside of the outer rail and then take the middle ordinate for the elevation of the curve. This will do well for roads that run trains at a high rate of speed, say 50 to 60 miles per hour; but it gives too much for trains at 30 miles per hour. When it comes to curves of ten degrees, no train should run around at a greater rate of speed than 25 to 30 miles per hour; consequently, six to seven inches is ample elevation.

MR. KERWIN—I think it would be all right, provided the curve was to a proper line to get the elevation to the curve by a string, but if the line of curve was imperfect it would be an improper course to pursue, and how many foremen can determine this accurately? I think there are very few.

MR. MCINARNA—We must assume that the curves are in line. My idea of elevation is this: We must elevate our curves according to the speed we run. The gentleman asks, how many foremen can find the correct degree of curve? If they understand their business they can; and if not, the roadmaster must teach them. I think the proper way to elevate a curve is that which will make the car ride the same as on a straight track when it strikes the curve; and going around a curve, the rule is, I think, one-half inch to a degree, running 60 miles an hour; we do not go beyond that. The rule on the N. Y. P. & O. R. R. is one-half an inch to a degree for all trains, and we have used that elevation for the last 12 years, and it has proved successful. Another point you must consider in the elevation is that you should not have more weight on one rail than on the other. The fact is, however, that one-half an inch to a degree we found was too much for our freight trains, but about right for the fastest passenger trains, and we found consequently that the rail on the inside would wear more than the rail on the outside. We have a three degree curve at 4¾ inch elevation, and the rail laid upon it had been laid one year, which I threw out. I found that the outside rail had one inch worn off in one year. I took out all the elevation except 2¼ inches and laid new rails upon it, and that rail lasted 7 years on the curve, and the rail was made more even. The inside rail wore about the same as the outside. We have a rule on the road that every foreman on the line can measure his own curve. Formerly we measured the curves ourselves, placed the degree of the curve on the telegraph poles for their information; the poles were 180 feet apart, and then we taught the men how to measure the curves themselves. We use a 44 foot string now.

Mr. Jordan—You spoke of a 3 degree curve with some 4 inches elevation. I understood you to say that an inch had worn off the outside of the rail.

Mr. McInarna—Yes, sir.

Mr. Jordan—It seems to me it should have been worn off on the inside.

Mr. McInarna—No, sir; the wheels hugged the upper rail and had a tendency to shove it off; we had a broad gauge at that time. We take the 44 inch string and put it along the rail and measure with the rail from the center of that string to the rail; that is a half inch upon a one degree curve; with a two degree curve, the distance is an inch, and the foreman will understand that he should give that curve one inch elevation. Our rule on the N. Y. P. & O. is one-half an inch to the degree. We run the elevation to the full extent at the beginning and end of every curve; we get the full elevation on the point of curve, and ease it off a degree for every 50 feet; the train takes its position the minute it strikes the point.

Mr. Buhrer—This is an important question. I have been on roads where it was almost impossible to stand up in the car while passing the curves; the curve was out of line and it was almost unsafe to ride over it fast. Our rule is ¾ of an inch to a degree of curvature up as high as five degrees; over five degrees we give it one-half an inch to a degree, and over a 10 degree curve, I would give it one-fourth of an inch to a degree of curvature. I find at that rate the trains run very fair, but with low peed I think one-half an inch elevation to the degree is enough. At the point of curve, I would give it full elevation, and from here out a quarter of an inch for every 30 feet until you run out n the straight track.

MR. KERWIN—C. & N.-W.—We have not many roads that run trains at the rate of 60 miles an hour. I use a line 48 feet long commencing at the point of curve from the inside to the outside of the rail and through the center of the line, the same as the others, and I find that will give sufficient elevation for any degree of curvature. The lighter the curve the less elevation is required; of course I think three-fourths of an inch to a degree is too much. My practice in getting my run out has been by elevating my inside rail to come up to the point of the curve, putting the level on and giving full elevation at the point, then drop back 120 feet, and citing from that back 120 feet to the elevation of the curve, giving a gradual run to the point of curve, and there you have the full elevation. You will have the full bearing according to the elevation; it makes no difference what degree of curve you get at that length for the speed; of course, if you wish a higher rate of speed, you can get more elevation. I think three-fourths of an inch elevation to a degree of curvature is too much for a speed of 35 or 40 miles an hour.

MR. BOWEN—I think one-half an inch to the degree is sufficient, and that the same run out will answer all curves; it does not make any difference how light or how sharp the curves. The easier the curve the easier the run, that will carry it on any curve you generally use. I think for a three degree curve, I should say start to put up the curve for a rate of 40 miles an hour, starting 150 feet back of the point of curve on a straight track, first 50 feet flange elevation; and for a 100 feet two inches; 150 feet, three inches, will make a nice lead for the curve, so that when you strike the curve you will not really know, if it is a good surface and line, whether you are on the straight track or on the curve.

MR. COLLOPY—Many roadmasters have a rule for putting up curves. I put them up in all shapes, and the only rule we formerly had was the "rule of thumb," and I find that a man who will follow Mr. Charles Latimer's instructions will very seldom miss it. It is almost impossible to adjust a curve to suit all rates of speed, in fact it cannot be done to make it good on an easy run of curve; a man that will start back 50 feet from the point of his curve, or 50 feet for every degree from the point of his curve and depress one rail as much as he elevates the other, when he strikes the point of curve he will have the full elevation and it makes the best and steadiest riding rail in the world.

MR. JOS. KINDELON—C. M. & St. P.—I have had some experience in putting up curved track. The man who advocates a half or an inch will go as high as 6 or 8 inches. It won't do to give it a half an inch or an inch to a degree. Cars ride as well on 13 degrees with 4½ inch elevation as with any other, at any rate of speed. Where a curve is in a hollow, and approaching each way with a heavy train I believe that curve has a little more elevation than any other on the line. Where a curve is up-grade at one place and down-grade at another, one train passes over it at 40 miles an hour, for instance, and the other at 15 miles an hour, and the elevation should be as low as it can be got, practically, to carry the 45 mile train over nicely and not be too high for the train coming up. It is almost impossible to establish any rule with a certainty for the amount to be allowed for the elevation of a curve. My way in approaching the curve and going off from it is as to what would be the handiest for the foreman, that is to take the joint at the end of a 30 foot rail to let out the elevation or raise it, and I think a 30 foot joint for every degree, allowing that to run out one-half inch to every degree of a curve is a first-class way to put up a curve; and when up to 10 degrees, for instance, I would not make the approach longer than 300 feet, as the train will right herself before reaching the curve on a length of 300 feet. I believe when we reach a curve we should carry the elevation from the point all the way around. I think with a three degree curve, 1½ inches of elevation will carry a train at a speed of 50 miles an hour; up to six degrees three inches elevation is enough; up to 7 degrees, that 3½ inches is enough, and after that increase the elevation in proportional parts of 4½ inches and increase the width of the gauge the proportional part of that in the width of the gauge between

7 degrees and 16, and what is left of 4½ inches above 3 inches, between 7 degrees and 16. I believe that up to 7 degrees any curve will ride with proper elevation perfectly; at the same time, this widening of the gauge assists on the elevation, because by widening the gauge it makes it harder to get the wheel up on the curve, and it answers two purposes at the same time; it gives the wheels a little more freedom and helps relieve you from giving so much elevation on the outer rail. Any man can understand the principle that widening the gauge makes it harder for the train to get up on the upper rail at a high rate of speed.

MR. LYNCH—The idea of trying to adjust a curve to the different rates of speed is wrong and it cannot be done. If you look to safety you elevate for your fast trains, and it comes, perhaps, nearer an inch to a degree than anything else.

MR. PEARSON—I think all the railroads in the country have freight trains as well as passenger, and speaking now as a civil engineer, I would say on our railroad we have adopted the rule of elevating the curve one inch to every degree of curvature, up to six degrees, and one-half an inch for all over that,—but the instructions to all of our section men is that they are to notice particularly the curve, and if they find the inside rail is wearing more rapidly than the outside rail, they understand that the curve is a little too high and lower the elevation; if they learn that the outside rail is wearing faster than the inside rail, they raise the curve a little, and after a little they get both rails to wearing alike. That is our way of doing. The passenger trains ride the best. Our sections are about six miles long, and we have three men and a foreman to a section.

MR. ADAMS—We run some fast trains on a four and five degree curve. The five degree curve has three inches elevation, and the four degree has about two and three-fourths. We run those curves at the rate of 58 seconds to the mile, and that is very fast, and the cars run very nice and level, and I find in watching those rails that there is no cutting and irregular wearing. I do not approve of this very heavy elevation; three inches and three and one-half on seven and eight degree curves is sufficient.

MR. JONES—Is that on a grade or upon a level track?

MR. ADAMS—It would not make any particular difference about that.

MR. BOWEN—I have 14 miles of track, and three, four and eight degree curves on it. I laid a 56 pound steel rail there in the fall of 1879, graveled the track, put those curves up at half an inch to a degree and I cannot see that the rails are worn scarcely at all by the flange cutting them, and they are spiked to the proper gauge, four feet eight and one-half inches. I think it is entirely unnecessary to add more than one-half an inch to a degree, no matter what the curviture is. Our trains run 40 miles an hour.

MR. LOVELL—I don't think it is exactly the thing to lay down an inflexible rule of either one-half inch or one inch per degree for the elevation of curves. Both these rules are mathematically correct—the one is based on a speed of 30, and the other of 40 miles an hour; but they are very indefinite to the trackman who in many cases does not know the degrees of his curves nor how to ascertain them, and particularly if they are compounds. On double track on an ascending and descending grade the rules just given fail him, if he knows them at all, and he elevates according to his judgment, which is sometimes good and sometimes bad.

In my early track experience I have been in just such difficulty myself, and since then it has been my desire to put a rule for the elevation of curves in such a shape as to combine theory and practice, and at the same time be intelligible to the trackman.

I would like to say first, that in only very exceptional cases should an elevation of six inches be exceeded, for as curviture increases speed should decrease. As was said before, the maximum speed upon which elevation is based is 40 miles per hour; and this basis of calculation is sufficient, although the actual speed may often reach 60 miles per hour.

The rule, then, which I have found to be most satisfactory is this:

Rule—To the speed per hour add one-half of itself, and the middle ordinate of a chord of that length will be approximately equal to the elevation.

Example—At a speed of 40 miles per hour; 40x20=60 feet—length of chord.

The middle ordinate of a 60 foot chord for 1 degree curve is about one inch; for a 2 degree curve, 2 inches, elevation 2 inches;

for a 3 degree curve, 3 inches, elevation 3 inches; for a 4 degree curve, 4 inches, elevation 4 inches; for a 5 degree curve, 5 inches, elevation, 5 inches; for a 6 degree curve, 6 inches, elevation 6 inches.

In this way the degree of any curve can also be obtained very closely, the middle ordinate of a 60 foot chord corresponding to the degree.

It may be desirable to use an elevation corresponding to three-fourths (¾) inch, instead of one inch per degree.

Then assume a speed of 35 miles per hour, and apply the rule given—

35 + 17½ = 52½ feet—length of chord.

1 deg. curve, 52½ chord, middle ordinate ¾ in., elevation ¾ in.
2 " " " " " " 1½ " " 1½ "
3 " " " " " " 2½ " " 2½ "
4 " " " " " " 3 " " 3 "
5 " " " " " " 3¾ " " 3¾ "
6 " " " " " " 4½ " " 4½ "

For an elevation to correspond to one-half (½) inch per degree assume a speed of 30 miles per hour. Then 30x15 = 45 feet.

1 deg. curve, 45 ft. chord, middle ordinate ½ in., elevation ½ in.
2 " " " " " " " 1 " " 1 "
3 " " " " " " " 1½ " " 1½ "
4 " " " " " " " 2 " " 2 "
5 " " " " " " " 2½ " " 2½ "
6 " " " " " " " 3 " " 3 "

Take an 8 and 10 degree curve at an elevation of one inch per degree there would have to be respectively 8 and 10 inches elevation; and here is where many get mixed. For the 8 degree curve assume a speed of 35 miles per hour, or ¾ inch per degree, corresponding to 52½ foot chord; then, 8x¾ = $\frac{24}{4}$ = 6 inches elevation.

For the 10 degree curve assume a speed of 30 miles per hour, or ½ inch per degree, corresponding to 45 foot chord; then 10x½ = $\frac{10}{2}$ = 5 inches elevation.

Instead, however, of a speed of 35 and 30 miles per hour for the 8 and 10 degree curves, it may be advisable to make it 20 or less, according to circumstances. Whatever it may be, apply the rule given, and obtain the length of the chord, and the rest is easy.

In compound curves when the compounds are short and frequent, and the changes are consequently abrupt, it is difficult to properly elevate. For such cases first decide upon the speed; then by the rule given obtain the chord, and from a given fixed point—generally the point of curve—apply the chord to the rail, measure the middle ordinate, and elevate accordingly. It is well in compounds to apply the chord from point to point on the rail, equal to about one-half the chord, so as to get an increasing or decreasing ordinate for an increasing or decreasing elevation. This may apply only in special cases, however.

The length of the approach or easement of curves is one of the things about which few care to express an opinion publicly. Some having a few curves, and presumably light ones, give the same approach to all; others say that they are governed by the degree of the curve, but give nothing definite.

The most general rule seems to be to elevate or drop, as the case may be, one-half (½) inch for every 30 foot rail. Take a 6 degree curve and 6 inches elevation—½ inch for a 30 foot rail will be 1 inch for 60 feet; then for six inches elevation—

6x60 = 360 feet = length of approach.

Or, take a 6 degree curve and 3 inches elevation, or ½ inch per degree.

3x60 = 180 feet = length of approach.

It seems to be the opinion that 360 feet is too long an approach.

The degree of curve having been ascertained and the elevation determined by the rules just given, I would suggest the following as a good rule for the approach:

Rule—Multiply the speed by the degree of the curve.

Example—Speed, 40 miles; degree of curve, 6—40x6 = 240 feet = approach; or, speed, 30 miles; degree of curve, 6—30x6 = 180 feet = approach.

In a 6 degree curve and 6 inches elevation and 240 feet approach there are eight thirty foot rails, and the approach for the 6 inches will be $\frac{6}{8}$ or $\frac{3}{4}$ inches for each 30 foot rail, as against ½ inch in the other case.

It is difficult to devise a simple rule which will apply proportionately to all curves at all speeds; but inasmuch as one inch per degree is the generally accepted elevation the rule just given would seem to be rather better than the other. All these rules, both for the elevation and the approach are approximately correct, mathematically, and are the result of no little experience, and are thrown out in hopes of being helpful to trackmen particularly.

MR. BURNETT—Elevations of curves is one of the vital things on railroads. It occurs to me that elevation should be enough to make your curves safe for passenger trains, and where you get more than that you are decreasing the number of cars hauled in freight trains and that is a feature to be looked after, for the loss of one or two cars in a train upon a *road* of heavy freight business is a serious loss. Most of the gentlemen seem to think one-half inch to the degree sufficient for a speed of forty miles per hour. I am inclined to think that is true; if it is true, then why use more than one-half inch? If your passenger trains run more than 40 miles per hour increase your elevation to three-fourths of an inch to the degree. I would not elevate to exceed six inches of my own accord, yet should the management of the road require it, of course it should be done.

Mr. Pearson says, speaking now as a civil engineer, we have adopted the rule to elevate curves one inch to each degree up to six degrees, then add one-half an inch for each degree thereafter. Such are the instructions given to foremen upon the road he is employed upon. Again he says the foremen have instructions to watch the wearing, etc., of the rails upon the curves, and if the lower rail is wearing too fast, lower the elevation, and vice versa. Now if he, as an engineer, believes that one inch is the correct elevation why this order to foremen to change the elevation? The question is asked, how are your foremen to know what the degree of his curves are? Gentlemen, every one of us are paid to instruct our foremen what the degree of his curves are, and what elevations we require him to give each and every curve, and see that he puts the curves up as directed, and maintain them, too. Not to give him strings and rules to find the degrees and elevations proper. I fully believe that your bad riding curves on examination will show to be more the cause of not having a true line and even elevation and gauge, than from want of more or less elevation. Upon the Rock Island road we find one-half inch to the degree serves us better than one inch. Our trains run 30 to 45 miles an hour and we find no bad results from one-half inch elevation of curves. I have one curve of ten degrees with

3½ inch elevation. True, the curve is at a point where we approach a station and often a freight train is compelled to stop on this curve; the elevation was reduced to accommodate the freight trafic. I am inclined to believe that elevation up to the speed of 45 miles an hour should not exceed one-half inch to the degree, and in no case should it exceed three-fourths to the degree, and elevation should stop at six inches.

MR. JONES—I would amend the motion before the house, to the effect that this discussion on curves be carried over to our next meeting, and a new committee appointed on the elevation of curves.

Motion seconded and carried.

MR. BURNETT—It is getting late and there are some committees to be appointed, and I would move that the executive committee be instructed to prepare a list of questions for our next meeting, and that the president be instructed to make the appointments of committees and to notify the appointees as soon after the questions are decided upon as possible.

Seconded and carried.

I move that this association return a vote of thanks to Mayor Harrison for his kind welcoming of the association to the city of Chicago.

Seconded and carried.

Mr. Burnett here resumed the chair.

MR. COLEMAN—I move that a vote of thanks be returned to the proprietors of this hotel, John A. Rice & Co., for the kindness and attention we have received at their hands during our stay in Chicago.

Seconded and carried.

On motion, adjourned to meet in St. Louis, Mo., the second (2nd) Tuesday in October, 1886, at 10:00 o'clock A. M.

EXCURSIONS.

On Friday morning, Oct. 16th, at 10:00 A. M., about 80 members of the association, many of them having their wives, took the special train furnished by the C. R. I. & P. Ry. Co., and went to South Chicago where they witnessed the manufacture of steel rails; they went from where the ore was taken from the bins and viewed every process and change until the rail was run out seething hot and leveled and straightened, ready to lay across the ties.

On their way from South Chicago to Pullman, they stopped at the Modern Frog and Crossing Works, and thoroughly inspected their articles in stock and in process of manufacture, among which were spring-rail frogs, crossings, split-switches, tie-bars, etc., and discussed their merits with a zeal and earnestness only known to roadmasters; then partook of the refreshments offered, and arrived at Pullman in time for dinner.

At Pullman, they found a place noted for its health and cleanliness; fine parks; smooth, clean streets; handsome residences, all of red brick; a place which in 1881 had only one family, and within one year from that time over 600, and at this time 1,480 families and a population of 8,626. The houses are built and rented by the company, and Mr. E. W. Hendricks, the agent who collects the rents, piloted the roadmasters through the Presbyterian church, a fine stone structure, and then to the public library with 5,600 volumes, and across the stairway to the Pullman opera house—a perfect little gem—where the electric lights were turned on, and a musician was found amongst their numbers in the person of Mr. S. H. Brown of the C. & N.-W. Ry., who was escorted to the organ and sang "Mrs. Brady's Pianny Fortay" and other popular airs, bringing down the house repeatedly. We give on the next page a section of one sung to good effect as caught by our stenographer. For—

"The man [roadmaster] who hath no music in himself,
And is not moved by concord of sweet sounds,
Is fit for treason, stratagems, and spoils;
The motions of his spirit are as dull as night,
And his affections dark as Erebus,
Let no such man be trusted." —[SHAK.

"THE LITTLE RED CABOOSE BEHIND THE TRAIN."

AIR—"The Little Old Log Cabin in the Lane."

I am a jolly brakeman, and squeezing wheels my trade,
While running on the road both day and night;
Throwing switches, pulling pins, as we switch about our train
And seeing that the couplings are all right.
We must always be on hand, when called to go out on the road,
No matter, in the sunshine, or the rain,
And the leisure moments that we have, we pass away below,
In the little red caboose behind the train.

CHORUS:—
The brake-shoes are worn out,
The wheels are pounding down,
She is loaded down with links, pins and chains,
And there's danger all around, if you lay down to sle
In the little red caboose behind the train.

Our red lights we hang each side, another one behind,
As days pass off and night is coming on;
And the boys who ride ahead, must keep a sharp look-out behind,
To see that all our trains a-coming along.
And as we near a station, you are startled from your thoughts,
By the sound of the shrill whistle's scream;
And you'll skip out on the "hurricane," and leave the "con." behi
In the little red caboose behind the train.

CHORUS, etc., etc.

On the morning of the 17th, those who had remai
availed themselves of the kind offer of a special train by
C. B. & Q. R. R., and visited the works of the Ajax Forge C
pany and other points of especial interest to roadmasters.

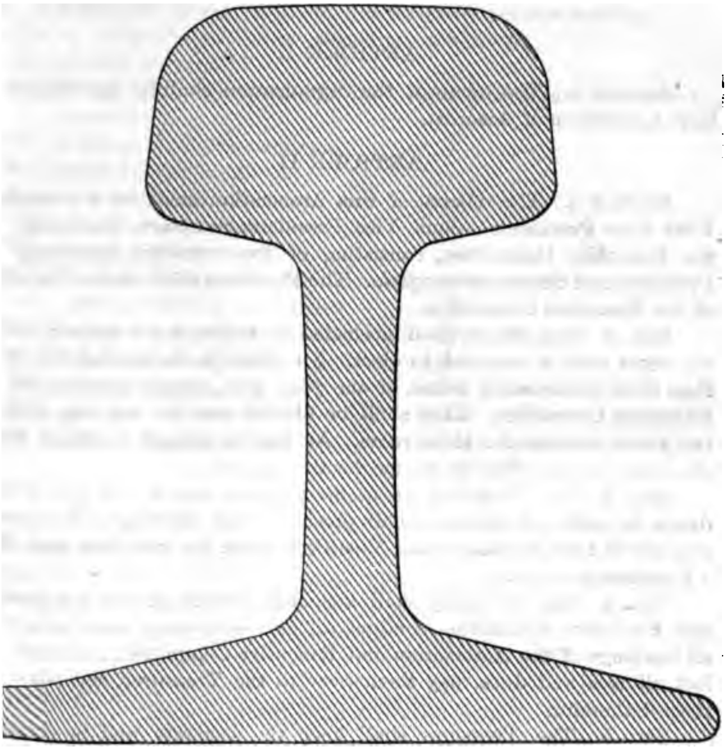


DIAGRAM OF RAIL-SECTION (70 lb.)

(*See debates, pages* 43-47.)

CONSTITUTION AND BY-LAWS.

ARTICLE I.

SECTION 1. The name of the organization shall be the Roadmasters' Association of America.

ARTICLE II.

SECTION 1. The officers of this Association shall be a President, First Vice President, Second Vice President, Secretary, Treasurer and the Executive Committee, consisting of five members, including the President and Secretary *ex officio*. The President shall be the Chairman of the Executive Committee.

SEC. 2. The officers shall be elected by ballot, and a majority of all the votes cast is required to elect. No officer to be elected for more than three consecutive terms, of one year each, except members of the Executive Committee. They shall be elected one for one year, one for two years, and one for three years. At regular annual meetings hereafter one member shall be elected for three years.

SEC. 3. The President, or, in his absence, one of the Vice Presidents, in order of election, shall preside at all meetings. In case of absence of both President and Vice Presidents, the members may elect a President *pro tem.*

SEC. 4. The Secretary shall keep the records of the Association and Executive Committee, conduct all correspondence, issue notices of all meetings of the Association and Executive Committee, and shall collect all fees and dues, pay them over to the Treasurer, and take his receipt therefor.

SEC. 5. The Treasurer shall keep the accounts and be charged with all the funds of the Association, and disburse them under the direction of the Executive Committee. He shall, at the annual meetings, or at any other time if required by the Executive Committee, furnish a statement of the funds, income, and expenditures of the Association.

SEC. 6. All bills against the Association must be approved by the Chairman of the Executive Committee before they shall be paid.

SEC. 7. The Executive Committee shall have the general management of the Association. Three members of this committee shall constitute a quorum at any regular or called meeting of the committee.

SEC. 8. Vacancies may be filled *pro tem.* by the President.

ARTICLE III.

SECTION 1. Regular annual meetings of the Association shall be held on the second Wednesday in September. Special meetings of the Association or the Executive Committee may be called by the President, if, in his judgment, it is for the interests of the Association to do so. Ten members of the Association shall be a quorum at any regular or called meeting of the Association.

SEC. 2. The place of holding the annual meeting shall be designated by a majority of the members present at the regular meeting.

SEC. 3. The order of business shall be as follows:

1. Opening ceremonies.
2. Reading the minutes of the last regular and any intervening meetings.
3. Enrollment of new members.
4. Reading communications.
5. Reports of committees.
6. Unfinished business.
7. Miscellaneous business.
8. Discussion of proper questions relating to duties of members, and appointing committees.
9. Election of officers for the ensuing year.
10. Choosing place of next regular meeting.

ARTICLE IV.

SECTION 1. No person shall become a member of this Association who is not a man of good moral character, and who is not a Roadmaster in good standing. If such, he may become a member by paying a membership fee of two dollars and fifty cents, and subscribing to the Constitution and By-laws.

SEC. 2. The Executive Committee shall have power to levy assessments upon members for the necessary expenses of the Association.

SEC. 3. Any member may be expelled from this Association by a two-thirds vote of the members present at any regular meeting.

ARTICLE V.

SECTION 1. This Constitution shall be subject to revision at any regular meeting of the Association by a vote of at least two-thirds of all the members present.

CULVERT PIPE

PLEASE READ THE FOLLOWING LETTERS:

BURLINGTON CEDAR RAPIDS & NORTHERN LAILWAY,
CEDAR RAPIDS, IOWA, *December 4, 1885.*

BLACKMER & POST, *St. Louis, Mo.:*

Gentlemen— In 1884 I used about 5,000 feet of your *Double Strength Culvert Pipe*, 24'' in diameter for Culverts on a new line built by the Company in Northwestern Iowa, and Southwestern Minnesota. It is now apparently in as good condition as when put in. None of the pipe broke during the winter, although some of it was partly filled with water.

I am using it now to replace small wood culverts on some of our older lines. Yours truly,

H. F. WHITE, *Chief Engineer.*

KENTUCKY CENTRAL RAILROAD COMPANY,
COVINGTON, KY., *December 2, 1885.*

Messrs. BLACKMER & POST, *St Louis, Mo.:*

Gentlemen—Answering your inquiry of the 30th ultimo, I have to say that we have used during the past few years, a large quantity of your *Double Strength Culvert Pipe* in the construction of the C. O. & S. W. R. R., etc., and I have pleasure in saying that the same has given entire satisfaction.

I have not heard of any failure when used under our enbankments.

Yours truly,

H. E. HUNTINGTON, *Superintendent.*

THAT OUR

DOUBLE STRENGTH CULVERT PIPE

Will endure the test of time, is shown by the above letters and many others in our possession. Its use is in no sense an experiment, and it has proven itself the MOST DURABLE and ECONOMICAL material in use for small culverts under Railroad Tracks.

For further testimonials and prices, address

Blackmer & Post,

325 Chestnut street, St. Louis.

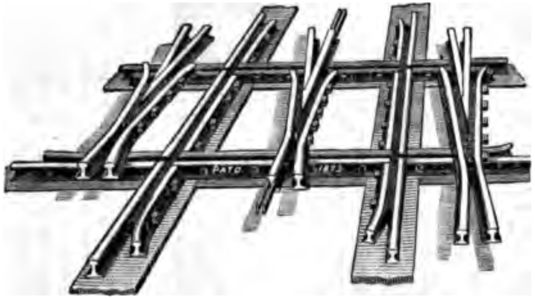
ELLIOT FROG AND SWITCH CO.

—MANUFACTURERS OF—

Railroad Frogs and Crossings,

Any Weight or Section of Rail Desired—or any Angle.

☞ Our Stiff Rail Frogs and Crossings are made with SOLID WROUGHT - IRON FRAMES.



Manufactured to Jan 1. 1886.

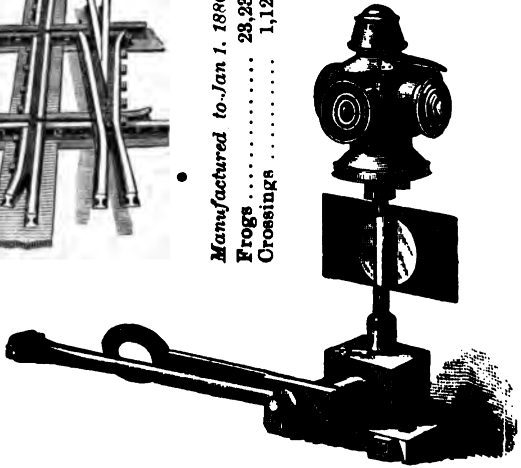
Frogs	23,235
Crossings	1,122

Spring Rail Frogs, Switch Stands and Switches

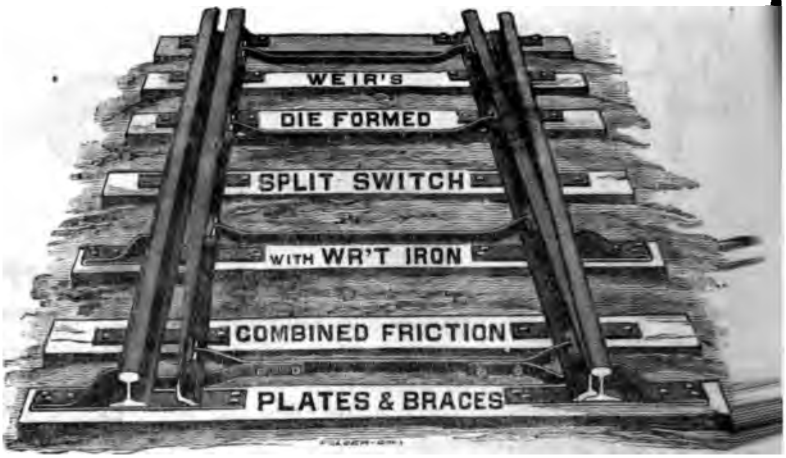
OF VARIOUS KINDS, TO WIT:

Split, Lapp and Stub, with Rods, Slide Plates and Head Chairs; Rail Braces, Wrecking Frogs, and General Railroad Iron Work. Our large capacity for this line of work enables us to fill orders promptly.

Estimates and other information furnished on application.



Address, EAST ST. LOUIS, ILL.



Our Die Formed Split Switches, as shown by this cut, possess many valuable and sup rior features. The die forming permits of the use of friction plates of wrought iron of uniform thickness. Our Combined Wrought Iron Brace and Friction Plate used with the have no equal, as they are indestructible, and we alone have the right to furnish them. W furnish with these switches well forged braces; the ends are very heavy, all set edgewise fo strength and all sunk to the level of the ties. These switches have a superior reputatio and large numbers are in use.

These cuts illustrate our Wrought Iron or Steel Plate Head Chair that are so much superior to the old cast iron, that further argument in their favor is unnecessary.

Is the Wrought Iron Rail Brace made by this Company and gotten up to supersede the old style of cast iron ones that are usually [illegible] yet are easily broken in spiking and from other causes. These are indestructible either in spiking or any other way, and as they only weigh 7 pounds, where the old style weighed from 15 to 25 pounds, they are fast doing what they are designed for, running the cast iron out. Several of the leading lines are now ordering them by the thousands.

To illustrate and describe all our manufactures, would be too much of an undertaking for this publication, but we shall be pleased to furnish estimates, photographs and blue prints on application. Address

THE WEIR FROG CO.,

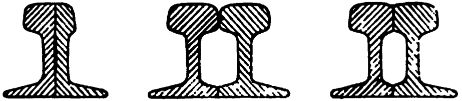
WORKS: Front, Smith & Water Stree

CINCINNATI, O.

THE WEIR FROG CO.

re a full line of goods for Track purposes, among which are six styles of Rigid · styles of Spring Frogs, also Die Formed Split Switches, Crossings, etc., etc. as lustrated herewith. There having been some discussion as to the merits of the ıethods of constructing points of frogs, we have concluded to show them all up, :here wil be but one conclusion by the level-headed, practical track-men.

'oss Section, No 1, shows ıethod of making points of notching the main point :ive short point rail. o. 2, shows the first im- t on this by which the head n point rail was preserved se weakened. Cut No. 3 shows the full strength of the main point rail preserved, cost of very materially weakening the short point rail, so that it has a very slim pport. Cut No. 4 shows the last improvement, which is the Weir system, manufactured and controlled exclusively by us. This is what we term our Die Formed Short Point. By this method we not only save the full strength of the main point rail, but more of the original strength of the short point rail and produce a stronger construction of the point rails generally.



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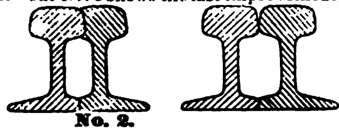

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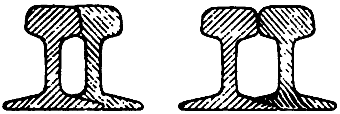

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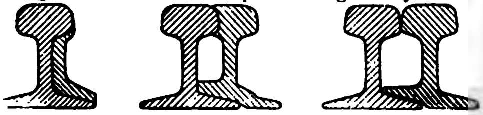
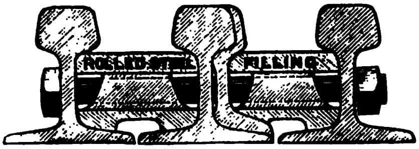


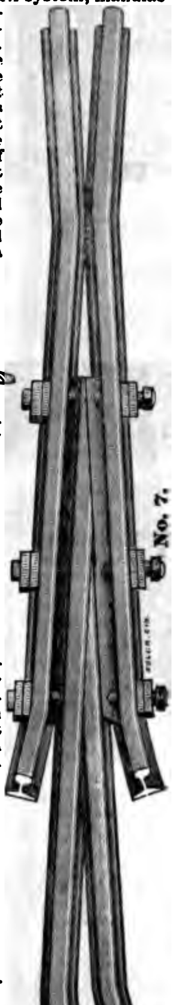
No. 4.

These cross section cuts are fair illustrations photographed down from full sized drawings, therefore they can be unhesitatingly accepted as correct.



No. 6.

Cuts Nos. 5 and 6 show plan and cross section of our celebrated Rolled Steel Filed Frog. We claim superiority for this, because of the steel filling and the manner of constructing the filling, by reason of which the vertical strain is entirely taken off of the bolts and is transmitted past them and on to the base of the rails. Several thousand of them are in use and have received the strongest kind of endorsements.



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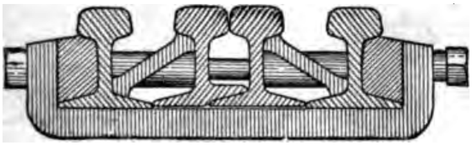
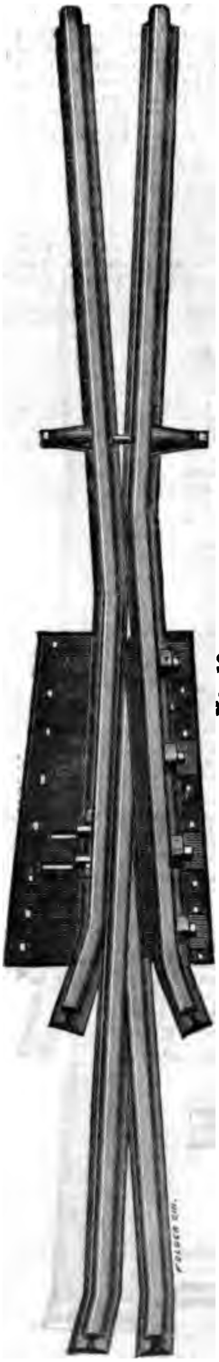


No. 8.

Cuts Nos. 7 and 8 represent plan and cross section of our Arched or Truss Frog, which is our latest improvement in rigid frogs. The *arch or truss plates are made of cast steel and the clamps of wrought iron.* We believe *this frog will prove itself second to none.*



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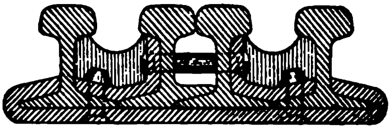
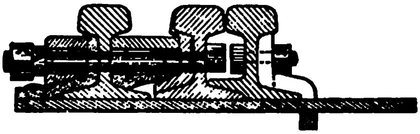


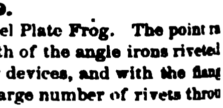
No. 9.

This is cross section of our Steel Plate Frog. The point ra have the additional vertical strength of the angle irons riveted them, which also serve as spacing devices, and with the flang steel plate by which we avoid the large number of rivets throu flanges of rails, we think we produce a superior plate frog those approving of the plate.



No. 11.

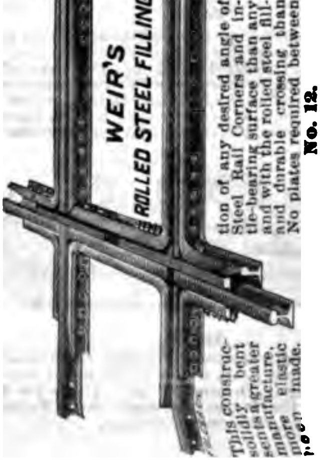
Cuts Nos. 10 and 11 show plan and cross section of Sp Frogs, which are on half inch steel plates, the same being sec to the frog by wrought iron angles or clips on the bolts pas through the webs of the rails and thereby saving injury to wing and point rails by riveting through these flanges. The l ing down strap is in U form, also secured to the web of the The springs are made of square steel with long range of mo This combined arrangement produces a very excellent frog, ing good satisfaction.



No. 13.

Our Rolled Steel l Crossings, as shown by Nos. 12 and 13, are ver tensively in use. The bination of the solidly steel rail corners, with r steel filling, presenting a superior Crossing. We recently improved their struction by die forming bent corners, as shown b cross section cut. By die forming process we serve the full flange o rail and reduce these c rails below the running thereby relieving them c necessary strains.

Our Crossings have a class record.



This construction of any desired angle of Crossing having solidly bent Steel Rail Corners and in- side guard, presents a greater tle-bearing surface than any other style of manufacture, and with the rolled steel filling completes a more elastic and durable crossing than has heretofore been made. No plates required between it and the ties.

No. 12.

E. S. GREELEY & CO.,

—SUCCESSORS TO—

G. TILLOTSON & CO.

MANUFACTURERS

WAY AND TELEGRAPH MACHINERY AND SUPPLIES,

Nos. 5 & 7 DEY STREET, NEW YORK,

(P. O. Box 1714.)

---

ack Tools and Materials.

☞ SOLE NEW YORK AGENTS FOR ☜

NA TOOL WORKS, manufacturers of SOLID Cast Steel Tools and Nut Locks.

GREELEY & CO'S" Solid CAST STEEL SPADES, SHOVELS and SCOOPS.

OIPEDE, HAND and SECTION CARS and Rail Benders.

ERS *in RAILS and FASTENINGS, SPIKES, ADZES, AXES; all Miscellaneous Supplies and* SIGNAL APPLIANCES.

ALAMAZOO R.R.

VELOCIPEDE CO.

MAZOO, MICH.,

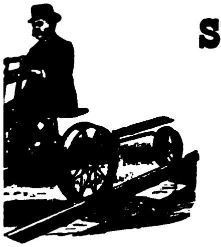
MANUFACTURERS OF

eel Velocipedes,

(Weight, 135 lbs.)

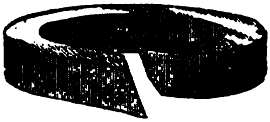
Cars, Section, Telegraph and Inspection Hand Cars, and

STEEL Baggage TRUCKS.



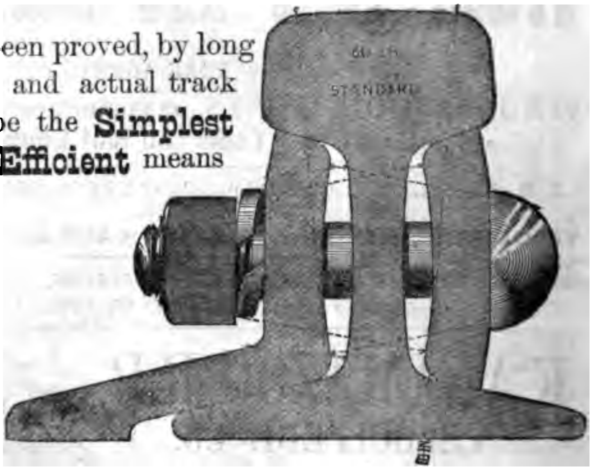
Our Cars are UNEQUALED for Speed and Durability. We guaran-
m to give satisfaction.
nd for new 32-page " Illustrated Catalogue and Testimonials."

KALAMAZOO R. R. VELOCIPEDE CO.



OVER 89,000,000 VERONA

NUT LOCKS IN USE.



This has been proved, by long Experience and actual track service to be the **Simplest** and **Most Efficient** means of securing

AN
ELASTIC
TIGHT
JOINT.

The VERONA Brand of TRACK-TOOLS

IS WELL KNOWN TO ALL WHO WANT GOOD

TRACK CHISELS, PICKS, CLAW BARS, SPIKE MAULS, SLEDGES, TRACK WRENCHES, RAIL TONGS and FORKS, etc. etc.

METCALF, PAUL & CO.,
VERONA TOOL WORKS,

PITTSBURGH, PA.,
7th Ave. and Liberty St.

CHICAGO, ILL.,
22 & 24 West Lake St.

☞ SEND FOR OUR CATALOGUE.

WM. J. MORDEN, Prest., Gen. Mgr.& Treas.] [Incorporated Capital Stock, $500,000

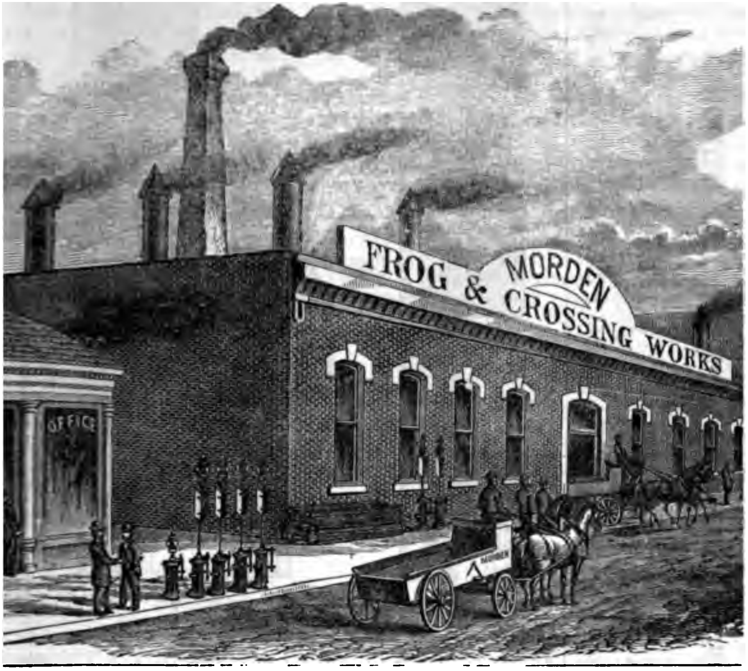
MORDEN FROG AND CROSSING WORKS,

MANUFACTURERS OF

WM. J. MORDEN'S PATENTS

AND

General Railway Track Supplies.



Morden's Solid Cast-steel Frog Points, with T Rail Wings.

Morden's All Steel T Rail U Plate Frogs and Crossings;
SPLIT SWITCHES, Miner's Stub Switch Attachment;
MORDEN'S Patent Tie-bar Clamp;
MORDEN'S Patent Guard Rail Clamp

Switch Stands of Any Pattern Desired.

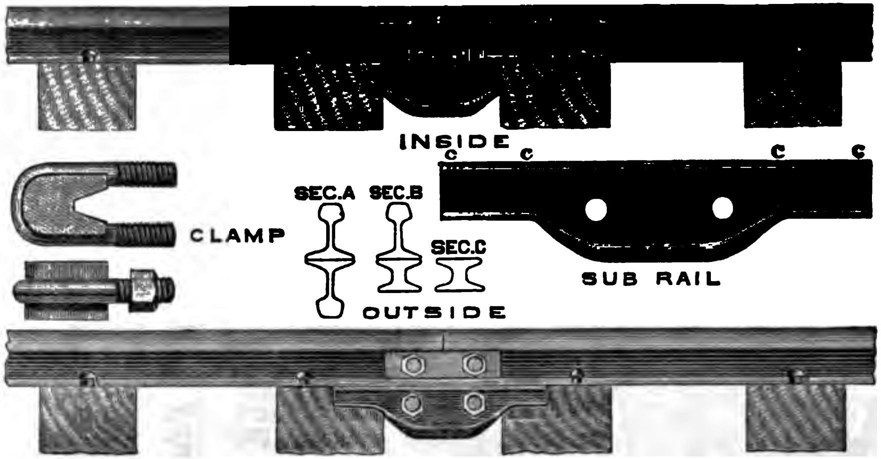
Wrought and Cast Iron Switch Chairs;
Round and Flat Tie Bars, etc.

☞ There has been over 15,000 Morden Frogs and 1,500 Morden rossings in use during the past seven years on the Leading Railways in this ountry and Mexico.

Works: SOUTH CHICAGO, ILL.

ity Office and Store Room:
No. 234 *South Clark Street* (Grand Pacific Hotel).

THE MORGAN RAIL JOINT.



THIS JOINT,

MADE FROM

Worn-out Steel or Iron

RAILS,

IS GUARANTEED TO BE

The Strongest, Most Economical and Enduring Joint extant.

☞FULL PARTICULARS UPON APPLICATION.

C. J. JUDD, Sec'y and Treas.

RICH'D P. MORGAN, Jr., Prest.
DWIGHT, ILL.

CHICAGO OFFICE---Royal Insurance Building.

A SHOVEL WITHOUT A RIVAL

The Remington Shovel.
☞ No bolts or rivets.

After other manufacturers have been many years experimenting for the purpose of obtaining a Perfect Tool, The Remington Agricultural Co. have succeeded in producing the most desirable Shovel and Scoop ever offered to the trade.

Fashioned from ONE PIECE of *Superior Cast Steel*, the part usually represented by straps upon the Handle, in the Remington Shovel forms a *complete Socket* without a week point, and the Blade being *without a rivet* will wear for months under severest trial before yielding to the effects of continued use. ☞ Where other shovels are *weakest*, the Remington Shovel is *strongest*.

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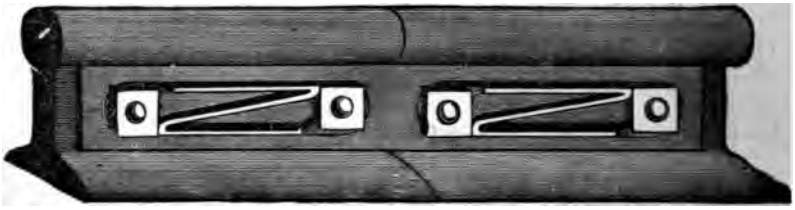

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OF THE

FOURTH ANNUAL CONVENTION

OF THE

Roadmasters' Association

OF

AMERICA,

HELD AT

The Lindell Hotel, St. Louis, Mo.,

October 12, 13 and 14, 1886.

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Proceedings of the Fourth Annual Convention

OF THE

ROADMASTERS' ASSOCIATION OF AMERICA,

HELD AT

THE LINDELL HOTEL, ST. LOUIS, MO.

OCTOBER 12TH, 13TH AND 14TH, 1886.

The Roadmasters' Association of America assembled at 10:30 A. M., October 12, 1886, in the ladies' ordinary at the Lindell Hotel, St. Louis, Mo., for the purpose of holding its Fourth Annual Convention, pursuant to adjournment. Officers present: I. Burnett, President; J. W. Craig, First Vice-President; John Sloan, Secretary; Thos. Adamson, Treasurer. The convention was called to order by the President, I. Burnett, as follows:

"GENTLEMEN:—The Roadmasters' Convention at Chicago adjourned to meet in St. Louis on the second Tuesday in October, 1886, at 10 o'clock A. M. That hour having arrived, you will consider yourselves in order for business. It had been expected that Mayor Francis, of this city, would be present on this occasion, yet I am informed that it will be impossible for His Excellency to be with us, he being engaged in the very pleasant and interesting ceremony of unveiling the statue of Columbus at Tower Grove Park. However, I have the pleasure of introducing to you Mr. S. W. Cobb, President of the Merchants' Exchange." Mr. Cobb's remarks were as follows:

MR. PRESIDENT AND GENTLEMEN OF THE ROADMASTERS' ASSOCIATION OF AMERICA—In the absence of Mayor Francis, who should perform this pleasant duty, I am here to extend to you a welcome to the city, which I very cheerfully and cordially do. Your convention is one of great importance, not only to the safety of life and property, but to the general development and progress of the whole country, and I trust in your deliberations the best means for the safety of life and property and for the promotion of every material and commercial interest may be intelligently discussed. The public will derive much benefit from the deliberations of such an intelligent, practical body of men.

"St. Louis has been called the city of conventions. I have often wondered why the people flock here from every part of the Union to hold their conventions. Is it because St. Louis is the most solid and substantial city in the country? Is it because her streets, hotels and public parks are the finest in the world? I think not; but it is because our city always receives her guests with open arms and hospitable hearts. We welcome all, not with the studied formality of the East, the cold indifference of the North, nor the stately dignity of the Sunny South, but rather with that broad, Western welcome that comes from the hearts of a progressive people; a welcome you can read in every eye, and feel in the warm grasp of every hand. Such a welcome, gentlemen, I extend to you to-day in behalf of St. Louis.

"I will also state, gentlemen, that the Merchants' Exchange extends to you a hearty invitation to call in a body, or singly, as you think proper, at any time you may select, and we will be glad to see you."

President Burnett—"Mr. Cobb, in behalf of the members of this Association I thank you for your hearty words of welcome and your kind invitation to visit the Merchants' Exchange. We will endeavor to avail ourselves of the privileges extended to us, and to so conduct our proceedings as a convention, and ourselves individually, that the citizens of St. Louis, or yourself, will never regret this hearty welcome extended to us."

Mr. Cobb retired and the Convention proceeded with its business.

The Secretary called the roll and the following gentlemen answered to their names:

Adamson, Thos., ...	Ohio & Mississippi R. R.
Atherton, L. E., ...	Chicago, Burlington & Quincy.
Burnett, I., ...	Chicago, Rock Island & Pacific.

Burnett, C. M.	
Buhrer, C.,	Chicago, St. Louis & Pittsburgh.
Cain, Geo. E.,	Wabash, St. Louis & Pacific.
Campbell, G. R.,	Ohio Central.
Craig, J. W.,	Charleston & Savannah.
Diddle, A. J.,	Indiana, Bloomington & Western.
Galarneau, F. X.,	Lake Erie & Western.
Grace, Percy,	Chicago, Milwaukee & St. Paul.
Griffin, M. J.,	New York, West Shore & Buffalo.
Hickey, T. H.,	Chicago, Rock Island & Pacific.
Houghton, R. R.,	Wabash, St. Louis & Pacific.
Hayward, Joseph,	Kansas City, St. J. & Council Bluffs.
Hanover, H. D.	Ohio & Mississippi.
Jones, C. E.,	Chicago, Burlington & Quincy.
Lynch, Pat.,	Indiana, Bloomington & Western.
McMichael, Geo. C.,	Wisconsin, Iowa & Nebraska.
Moran, J. T.,	Illinois Central.
McEntaffer, D.,	Wheeling & Lake Erie.
Melville, Chas.,	Wabash, St. Louis & Pacific.
Nichols, E. M.,	Indiana Coal Company.
Preston, J. H.,	Chicago, Rock Island & Pacific.
Ryan, James,	Chicago & Eastern Illinois.
Swinney, S. L.	
Sloan, John,	Indiana, Bloomington & Western.
Sloan, James,	Chicago & Eastern Illinois.
Shea, M.,	Cincinnati, New Orleans & Texas Pacific.
Wright, George,	Atchison, Topeka & Santa Fe.
Witty, J. B.,	I. W.
Adams, A. D.,	Wabash, St. Louis & Pacific.
Brown, W. F.,	Wheeling & Lake Erie.
Dickson, Thos.,	Cleveland & Pittsburgh.
Freeland, A. N.,	Atlantic Coast Line.
Fitzgerald, Thos.,	Shenandoah Valley Ry.
Hildebrant, J. D.,	Southern Kansas.
Jordan, O. S.,	Michigan Central.
Lewis, G. W.,	Denver & Rio Grande.
Linsley, J. H.,	Chicago, Burlington & Quincy.
Larr, G. W.,	Wabash, St. Louis & Pacific.
Marshall, James,	Chicago & Alton.
Mahony, D.,	Ohio & Mississippi.
Perry, J. A.,	Virginia Midland.
Stinson, W. B.,	Grand Rapids & Indiana.
Thomas, J. L.,	Galveston, Harrisburg & San Antonio.
Walsh, Thos.,	Ohio & Mississippi.
Warren, Carson,	C. C. & A.
Watts, T. J.,	*Duluth & Iron Range.*

List of members joining the Association at St. Louis:

Brandt, Wm	C. & N. W. R. R.	Madison, Wis.
Byrne, Hugh	L. N. A. & C. R. R.	Lafayette, Ind.
Battin, H. W	C. & N. W. R. R.	Tracey, Minn.
Burns, M. F	U. P. R. R	Boulder, Colo.
Briggs, J. W	N. P. R. R	Missoula, M. T.
*Barrett, P. W	L. & H. R. R. R	Warwick, N. Y.
Bates, W. G	A. T. & San. Fe R. R.	Florence, Kans.
Barry, John	W. & W. R. R	Richmond, Va.
*Caffrey, Richard	Lehigh Val. R. R.	White Haven, Pen
Carnahan, W. J	T. & P. R. R	Wetherford, Tex
Carney, C	Ill. Cent'l R. R	LeMars, Iowa.
Coughlin, W. J	C. M. & St. P	
*Crowley, Wm	A. & P. R. R	Williams, Ariz.
Drury, E. G	C. M. & St. P. R. R.	Marion, Iowa.
Diddle, W. G	D. O. & O. R. R. R.	Kansas, Ill.
Donahoe, W. J	C. R. I. & P. R. R.	Des Moines, Iowa.
*Dodson, Jno. A	B. & D. R. R	Greensboro, N. C.
Dickson, J. A	B. N. & C. R. R. R.	Rochester, N. Y.
Daley, P. W	L. E. & W. R. R.	Lima, O.
*Davey, E. C	Wabash R. R	Chillicothe, Mo.
Devine, M. W	At. Coast Line	Fayetteville, N. C
Erwin, Wm	K. & P. R. R	Kingston, Ont.
Edwards, E. P	C. & N. W. R. R	Webster City, Iow
Flynn, Luke	C. & N. W. R. R	Eagle Grove, Iowa
Fitzpatrick, T	S. P. R. R	Sierra Blanco, Tex
Gallagher, M	W. C. R. R	Ashland, Wis.
Galvin, J. T	O. C. R. R	Grant's Pass, Ore.
Gilhooley, M	L. & N. R. R	La Grange, Ky.
Glenn, Pat	O. R. & N. R. R	The Dalles, Ore.
Gilchrist, G. B	U. P. R. R	Buena Vista, Colo.
*Geone, D. E	Tex. Pac R. R	Marshall, Tex.
*Gaffney, John	St. L. Ft. S. & W. R. R.	Toronto, Kans.
Harrison, G. W	West'n Ry. of A. R. R.	Marion, Ala.
*Hawkins, A. M	Norfolk So. R. R	Berkley, Va.
Houghton, H. H	L. S. & M. S. R. R	Elyria, O.
Hamill, James	D. & R. G. W. R. R	Salt Lake, Utah.
Jacobs, P. H	C. & N. W. R. R	Winona, Minn.
*Kitel, E. R	C. & N. W. R. R	Chicago, Ill.
Lem, L.	Tex. Pac. R. R	Baird, Tex.
*McGurgan, F. H.	Wabash R. R	Moberly, Mo.
McGiven, J.	N. P. R. R	Brainerd, Minn.
McEwin, Chas.	B. C. R. & N. Ry.	Sibley, Iowa.
McCormack, P	M. & C. Ry	Iuka, Miss.
*McAvoy, Anthony.	M. & L. R. Ry	Brinkley, Ark.
M[illegible]e, H. C.	N. Y. C. & N. Ry	East View, N. Y.

Molyneux, M	G. C. & San. F. Ry.	Dallas, Tex.
*Mulvey, Jas	J. M. & I. Ry.	Columbus, Ind.
Mallard, Chas. C.	Morgans Lo. & T. Ry.	New Orleans, La.
*Mulland, R. D.	C. S. Ry.	Somerset, Ky.
McKeown, P. W.	D. L. & W. Ry.	Mt. Morris, N. Y.
Madigan, T. J.	T., St. L. & K. C. Ry.	Charleston, Ill.
Nelson, C. L.	O. P. Ry.	Daggett, Cal.
O'Boyle, J.	D. & R. G. Ry.	Grand Junction, Colo.
O'Neil, Dennis.	S. C. Ry.	Auburn, N. Y.
*O' Leary, D.	D. & D. Ry.	Waverly, Iowa.
Payne, W. F.	C. St. P. M. & O. Ry.	St. Paul, Minn.
*Purcell, M.	J. M. & I. Ry.	Columbus, Ind.
*Perry, Thos. H.	L. E. & W. R. R.	Bloomington, Ill.
*Phillips, John.	Ohio & Miss. R. R.	Lebanon, Ill.
Repelye, John.	U. P. R. R.	Denver, Colo.
Ryan, J. C.	U. P. R. R.	Denver, Colo.
*Ready, M.	Vandalia R. R.	Effingham, Ill.
Rielly, Philip.	P. & N. Y. C. R. R.	Tunkhannock, Penn.
*Scott, Stephen G.	G. R. & I. R. R.	Plainwell, Mich.
Shine, Danl., Jr.	B. N. Y, & P. R. R.	Olean, N. Y.
*Swart, E. F.	S. C. R. R.	Auburn, N. Y.
Stuart, John.	L. S. & M. S. R. R.	Coldwater, Mich.
*Sommersett, W. B.	Car. Cent. R. R.	Shoe Heel, N. C.
*Schofield, John.	J. H. & I. R. R.	Brazil, Ind.
*Shearer, L. H.	Lehigh Valley R. R.	Buffalo, N. Y.
Shoemaker, J. P.	C. M. & St. P. R. R.	Sioux City, Iowa.
Smith, D.	O. R. & N. R. R.	Portland, Oregon.
Tudhope, John.	U. P. R. R.	Lawrence, Kan.
*Trumbull, Jas.	S. C. R. R.	Kingsville, S. C.
Wallace, W. J.	E. S. R. R.	Eureka Springs, Ark.

All those marked thus * were present and answered to their names.

The President—An opportunity will now be given those who desire to make application for membership to do so.

The secretary announced that sixty-four applications had been made for membership since last meeting, with dues accompanying each application.

On motion the applications were received and placed on file.

LIST OF OLD MEMBERS.

Adams, Thos.	B. & O.	Connelsville, Penn.
Adamson, Thos.	O. & M.	Lawrenceburg, Ind.
Atherton, L. E.	C. B. & Q.	Keokuk, Iowa.

Adams, A. D	W. St. L. & P. Ry	La Fayette, Ind.
Burnett, I	C. R. I. & P	Joliet, Ill.
Burnett, C. M	Central Iowa	Marshalltown, Iowa.
Bailey, Isaac	W., St. L. & P	Griggsville, Ill.
Brown, Geo. M	Flint & Pere Marq	East Saginaw, Mich.
Blesswan, J	C. B. & Q	Creston, Iowa.
Breckenridge, W. L	C. B. & Q	Beardstown, Ill.
Bowen, B	Wisconsin Central	Stevens Point, Wis.
Brink, J	Wisconsin Central	Oshkosh, Wis.
Brennan, J. C	St. P. M. & M	St. Paul, Minn.
Brenan, J. J	St. P. M. & M	Minneapolis, Minn.
Buhrer, C	C. St. L. & P	Cambridge C., Ind.
Butler, John	I. C	Pontiac, Ill.
Brown, S. H	C. & N. W. Ry	Elroy, Wis.
Buel, H. A	C. M. & St. Paul Ry	McGregor, Iowa.
Bartlett, Daniel	K. C. St. J. & C. B. Ry.	St. Joseph, Mo.
Bolan, Jas	D. B. C. & A. R. R	East Tawas, Mich.
Bolan, Mat	Central Iowa Ry	Ackley, Iowa.
Burgdorf, C. W	Union Pacific	Denver, Col.
Baxter, R. W	S. P. Coast R. R	Oakland, Cal
Brown, W. F	W. & L. E. Ry	Norwalk, Ohio.
Blemer, J. R	T. C. & St. L. Ry	Marion, Ind.
Bennett, George	U. P	Lincoln, Neb.
Brown, E	U. P	Rawlins, Wyo.
Beauprie, W. R	C. & W. I	Auburn Junc., Ill.
Boardman, E. A	U. P	Golden, Colo.
Burke, P. D	C. P	Calgary, Alberta.
Baker, R	I. B. & W	Urbana, Ill.
Boom, John P	L. N. A. & C	Frankfort, Ind.
Carle, J. D	B. C. R. & N. Ry	Watertown, Dak.
Cronin, Thos	Mo. Pac. Ry	Palestine, Tex.
Conners, J. S	Canadian Pac. Ry	Winnipeg, Man.
Capwell, W. E	A. T. & S. F. Ry	Nickerson, Kan.
Cain, Geo. E	W. St. L. & P	Peru, Ind.
Courtney, W. H	L. S. & M. S	Erie, Penn.
Crippen, J. A	C. R. I. & P	Des Moines, Iowa.
Cox, A	C. St. P. M. & O	Le Suer, Minn.
Collom, J	D. O. & O. R	Olney, Ill.
Cox, J. E	C. M. & St. P	Sanborn, Iowa.
Cornell, C. H	C. M. & St. P	Dubuque, Iowa.
Carnes, E. H	C. St. P. M. & O	Worthington, Iowa.
Craig, J. W	C. & S	Charleston, S. C.
Cummings, John	C. P	North Bay, Ont.
Collopy, J. H	N. Y. C. & St. L	Bellevue, Ohio.
Campbell, G. R	O. C	Bucyrus, Ohio.
Coleman, D	A. T. & S. F	Topeka, Kan.

K	C. R. I. & P.	Atlantic, Iowa.
HN	D. L. & N.	Ionia, Mich.
G. W.	Formerly C. R. I. & P.	Wilton, Iowa.
. J.	I. B. & W.	Indianapolis, Ind.
OMAS	M. L. S. & W.	Manitowoc, Wis.
	B. & O. Ry.	Newark, Ohio.
J	Can. Pac. R. R.	Winnipeg, Man.
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M	K. & P. Ry.	Kingston, Can.
C.	Illinois Central	
	C. M. & St. P.	Sigourney, Iowa.
L.	T. C. & St. L.	Frankfort, Ind.
V. W.	Ga. Pac. Ry.	Douglasville, Ga.
MES	A. & N. M. Ry.	Lordsburg, N. M.
A. N.	Atlantic Coast L.	Sumter, S. C.
), Thos.	Shenandoah Vy. Ry.	Shepardstown, W. V.
	N. P.	Billings, Mont.
, F. X.	L. E. & W.	Lima, Ohio.
W. H.	C. M. & St. P.	Monticello, Iowa.
RRY	C. M. & St. P.	Waukesha, Wis.
I. J.	N. Y. W. S. & B.	Kingston, N. Y.
C.	N. P.	Billings, Mont.
HN	G. H. & San. An.	Schulenberg, Tex.
S	M. H. & O.	Ishpeming, Mich.
D.	I. I. & I. Ry.	Kankakee, Ill.
HOS	C. R. I. & P.	Geneseo, Ill.
	C. B. & Q.	Red Oak, Iowa.
). M.	C. M. & St. P.	Horicon, Wis.
R. R.	W. St. L. & P.	Defiance, Ohio.
L	C. M. & St. P.	Calmar, Iowa.
Joseph	K. C. St. J. & C. B.	St. Joseph, Mo.
		Fairmount, Iowa.
3	C. M. & St. P.	Wells, Minn.
I	Fargo Southern	
P. H.	C.M. & St. P.	Perry, Iowa.
ES M.	L. & N.	La Grange, Ky.
	A. T. & S. F.	Emporia, Kan.
I. D.	Ohio & Miss.	Aurora, Ind.
E.	C. M. & St. P. Ry.	Marion, Iowa.
C. P.	R. & D. R. R.	Atlanta, Ga.
I	Central Pac. Ry.	Promontory, Utah.
, J. C.	Atl. & Pac. Ry.	Daggett, Cal.
IN	N. P. Ry.	Bozeman, Mon.
HOS	M. C. R. R.	Jackson, Mich.
r, J. D.	Southern Kan. Ry.	Lawrence, Kan.
S.	M. C. R. R.	St. Thomas, Ont.

Jones, C. E.	C. B. & Q.	Beardstown, Ill.
Kurdilan, J.	C. M. & St. P. Ry.	Mitchell, Dak.
Kenney, J.	C. M. & St. P. Ry.	Oxford Junction, I
Keller, C. B.	White Water R. R.	Cambridge City,
Kerwin, J. A.	C. & N. W. R. R.	Madison, Wis.
Keller, L. L.		
Kelly, R. J.	C. I. St. L. & C.	Kankakee, Ill.
Kelly, J. B.	C. M. & St. P.	
Kelley, M. D.	St. P. & D.	St. Paul, Minn.
Lynch, Pat	I. B. & W.	Kenton, Ohio.
Lovell, D. H.	Penn. R. R.	Renovo, Penn.
Lehman, C. A.	C. & N. W. R. R.	Sterling, Ill.
Lewis, Geo. W.	D. & R. G. Ry.	Durango, Colo.
Loftus, P. H.	C. & N. W. R. R.	Milwaukee, Wis.
Lockie, Geo. J.	A. T. & S. F. Ry.	Newton, Kan.
Larvix, Chas.	B. R. B. & L. Ry.	Winthrop Jc., Mi
Lee, W. F.	C. R. I. & P. Ry.	Keokuk, Iowa.
Linsley, J. H.	C. B. & Q. Ry.	Galesburg, Ill.
Larr, G. W.	W. St. L. & P. Ry.	Forest, Ill.
Marshall, James	Chi. & Alt. Ry.	Huntington, Ind.
Mulcahy, Edward	C. W. & M. Ry.	Elkhart, Ind.
Massey, O. M.	N. P. Ry.	Sprague, W. T.
Mahoney, D.	O. M. Ry.	Olney, Ill.
Moran, Thos.	Chi. & Atl. Ry.	Kenton, Ohio.
McInarna, M. J.	N. Y. P. & O. R. R.	Mansfield, Ohio.
McNarney, M.	C. M. & St. P. Ry.	Elgin, Ill.
McMichael, Geo. C.	W. I. & N.	Marshalltown, Io
McClintock, W. H.	L. & N.	Louisville, Ky.
McDonald, J. H.	C. & N. W.	Escanaba, Mich.
Moll, J. B.	C. M. & St. P.	Faribault, Minn.
McQuiston, J. C.	C. I. St. L. & C.	Indianapolis, Ind
Meeker, C. R.	C. B. & Q.	Aurora, Ill.
Mitchell, C. F.	C. M. & St. P.	Mazomanie, Wis.
Mott, E. H.	G. B. W. & St. P.	Plover, Wis.
Moore, A.	C. I. St. L. & C.	Greensburg, Ind.
Moran, J. T.	Illinois Central	Waterloo, Iowa.
Mayer, J.	St. P. M. & M.	Delano, Minn.
McMillan, John	C. M. & St. P.	Minneapolis, Min
Marsh, F. M.	S. C. & P.	Mo. Valley, Iowa
Morris, T. O.	C. I. St. L. & C.	Indianapolis, Ind
Mills, E. R.	Southern Central	Moravia, N. Y.
Merrill, G. W.	L. S. & M. S.	Hillsdale, Mich.
McBride, James	W., St. L. & P.	Jacksonville, Ill.
McDonough, M.	Texas Pacific	Marshall, Tex.
McEntaffer, D.	W. & L. E.	Norwalk, Ohio.
Meeds, F. W.	A. & P.	Albuquerque, N.

Morgan, J. F.	N. P	Missoula, Mont.
Melville, Chas.	W. St. L. & P	Havana, Ill.
Mahoney, M	W. C. & W. M	Chippewa Falls, Wis.
McLeod, Anthony	U. P	Junction City, Kan.
Nash, J. L	C. M & St. P	Egan, Dak.
Nolan, P	N. O. & T. R	Oakdale, Tenn.
Nichols, E. M	C. R. I. & P	Joliet, Ill.
Newcomb, G. B	North Eastern Ry	Florence, S C.
O'Brien, Joseph	Ill. Cen. R. R	Champaign, Ill.
Perry, J. A	Vir. Mid. R. Ry	Charlottesville, Va.
Pustine, Bryan	D. L. & N. R. R	Ionia, Mich.
Philbin, M	C. R. I. & P. Ry	Joliet, Ill.
Plunkett, P	M. L. S. & W. Ry	Clintonville, Wis.
Pierce, H	C. H. & D. Ry	Connersville, Ind.
Preston, J. H	C. R. I. & P	Des Moines, Iowa.
Pease, W. S	C. M. & St. P	Elgin, Ill.
Potter, W. H	C. M. & St. P	Tama City, Iowa.
Pearson, J. H	L. N. A. &. C	Louisville, Ky.
Phelon, E. M	C. M. & St. P	Millbank, Dak.
Peters, P	A. T. & S. F	Topeka, Kan.
Rafferty, Thos	C. M. & St. P	Lauerston, Minn.
Raynor, T. M	C. & G. T	Battle Creek, Mich.
Roach, P	O. & M	Pana, Ill.
Ross, Donold	D. G. H. & M	Pontiac, Mich.
Reton, V. A	C. M. & St. P	Monroe, Wis.
Richards, O. D	L. S. & M. S	Andover, Ohio.
Reed, W. H	S. F. & W	Savannah, Ga.
Ryan, James	C. & E. I	Danville, Ill.
Robbins, W. L	E. & T. H	Evansville, Ind.
Rogers, James	L. N. A. & C	Louisville, Ky.
Robinson, T. V	C. St. L. & P	Algona, Iowa.
Reeves, O	C. & N. W	Marinette, Wis.
Roberts, John	I. B. & W. Ry	Columbus, Ohio.
Rielly, Wm	C. & A. Ry	Bloomington, Ill.
Rahm, John M	Penn. & N. Y. Ry	Towanda, Penn.
Ross, John	F. & P. M. Ry	Evart, Mich.
Sweeney, D	Den. & R. G. Ry	Canon City, Col.
Scott, J. W	C. O. & S. W. Ry	Cecilia, Ky.
Sullivan, Martin	Cen. Pac. Ry	Truckee, Cal.
Schofield, James	Northern Pac. Ry	Livingston, Mont.
Sharkey, P	K.C. St. J. & C. B. Ry	Council Bluffs, Ia.
Shea, John F	U. & B. R. Ry	Ogdensburg, N. Y.
Smith, Richard	S. Pac. R. R	Woodville, Tex.
Stackhouse, R. J	Danbury & Norwalk	Danbury, Conn.
Stimson, W. B	G. R. & I. Ry	Grand Rapids, Mich.
Sheahan, *D*	*C. I. Ry*	Monmouth, Ill.

Steen, R.	C. M. & St. P.	Marion, Iowa.
Sagerdahl, Wm.	C. & G. T.	Valparaiso, Ind.
Swinney, S. L.	W. St. L. & P.	Bement, Ill.
Sutherland, A. M.	C. & N. W.	Florence, Wis.
Steele, J. R.	W. St. L. & P.	Forrest, Ill.
Sloan, John	I. B. & W. R'y	Indianapolis, Ind.
Sloan, James	C. & E. I.	Danville, Ill.
Stockwell, C. H.	C. M. & St. P.	Coon Rapids, Iowa.
Stafford, M. A.	Central Iowa	Brighton, Iowa.
Shattuck, C. D.	C. M. & St. P.	Faribault, Minn.
Sullivan, J.	Illinois Central	Dubuque, Iowa.
Sanger, F. E.	St. L. K. & N. W.	Keokuk, Iowa.
Shaw, G. R.	O. R. & N. Co.	Portland, Oregon.
Shea, M.	C. N. O. & T. P.	Newport, Ky.
Salter, J. F.	Miss. & Tenn.	Sardis, Miss.
Steiner, J. L.	P. D. & E.	Grayville, Ill.
Solon, A.	C. B. & Q.	Rock Island, Ill.
Smith, J. C.	C. R. I. & P.	Wilton, Iowa.
Thompson, W. A.	C. & G. T.	Blue Island, Ill.
Tripp, Geo. B.	C. M. & St. P.	Tomah, Wis.
Tierney, John		
Tompkins, J.	C. H. & D.	Lima, Ohio.
Thomas, I. L.	G. H. & S. A. Ry.	Houston, Tex.
Unger, Nicholas	F. & P. M. Ry.	Ludington, Mich.
Wilson, D. C.	W. St. L. & P.	Ferguson, Mo.
Worcester, J. A.	C. & N. W.	Iola Grove, Iowa.
Wyman, M. P.	Northern Pacific	Glendive, Mont.
Weatherston, John.	Det. Bay City & Alpena	Lapeer, Mich.
Wright, John W.	C. & N-W.	Madison, Wis.
Wright, David	C. M. & St. P.	Red Wing, Minn.
Williams, G. M.		Minneapolis, Minn.
Witty, I. B.	I. W.	Indianapolis, Ind.
Wright, George	A. T. & S. F.	Topeka, Kan.
Worley, Geo.	Hot Springs Ry.	Malvern, Ark.
Walsh, N.	Can. Pac. Ry.	Three Rivers, Quebec.
Walsh, Thos.	Ohio & Miss. Ry.	Mitchell, Ind.
Wagoner, J. C.	Ft. W. C. & L. Ry.	Ft. Wayne, Ind.
Worthley, A. H.	K. C. St. J. & C. B. Ry.	St. Joseph, Mo.
Warren, Carson.	C. C. & A. R. R.	Chester, S. C.
Willis, R. A.	C. St. P. M. & O.	Omaha, Neb.
Watts, T. J.	Duluth & Iron Range.	Two Harbors, Minn.

The President:—Gentlemen, I am glad there are so many of the old members answering to roll call, yet not quite half that should have been present; I did expect to see not less than enty-five at this roll call. However I think many more will ve arrived before night.

We will take up the business as we left it. Unfinished busi-s seems to be first in order, but the records do not show any.

FOOT-GUARDS.

At Indianapolis, two years ago, a committee on foot-guards s appointed to report at the next meeting. That committee ed to report at Chicago, a year ago, and asked for further e, which was granted. They said then they would make a d report at the next meeting.

The chairman of that committee is here; the other members t are not. I would like to hear his report if he has one to sent.

J. H. Preston—I was appointed on that committee. A. Cox, of C. St. P. M. & O., and D. Wright, of the C. M. & St. P., re also appointed as members. We have been unable to agree. s chairman, undertook a year ago to arrive at some decision in ard to the best appliance for foot-guards, and I could get very little out of the other members of the committee, their im being that they were too busy. This summer I endeavored get them down to a point on the foot-guard matter, but was able to do so. The other two members claim to have had no perience whatever with foot-guards, and will not give any ecision at all as to which is the best. I undertook to and did write out a report, that I believe to be correct, myself, and referred it to the other members for their signatures. They returned it with my letter attached, and their objections to foot-guards in general, which, if the Chair wishes, I will read. However, I would suggest that we dispense with this, and would further ask that the committee, having disagreed, be discharged from further action in the matter; and if the convention then wishes, to appoint a new committee on the subject, which I think would be a good idea, it being a very important matter, it can be done.

C. A. Lehman—C. & N. W.—I move that the gentleman, Mr. Preston, read the letters he received from the other members of the committee.

Carried.

The Secretary read the letters of A. Cox and E. Wright.

By request of the President, First Vice-President J. W. Craig took the chair.

President Burnett—Mr. Chairman, I move that a standing committee of five be appointed by the Chair, to whom shall be referred all questions of this nature that may arise during this meeting.

Carried.

The Chairman appointed as members of the committee C. E. Jones, C. B. & Q.; F. X. Galarneau, L. E. & W.; S. L. Swinney, T. P. & W.; R. A. Houghton, W. St. L. & P.; H. D. Hanover, O. & M.

President Burnett—Mr. Chairman, I move that the committee on foot-guards be discharged, and that the question of foot-guards be placed in the hands of the standing committee, with instructions to report to this convention to-morrow morning at 9 o'clock.

Carried.

At this stage of the proceedings, President Burnett resumed the chair.

J. W. Craig—I am very sorry to see a question that has been in the hands of a committee for two years for a report returned to this convention without action.

President Burnett—I am inclined to think that Mr. Preston has done his duty so far as he is concerned. Inasmuch as the question is in the hands of another committee it is not in order to discuss it further here. We will now take up the question of the

ELEVATION OF CURVES.

The committee, composed of D. H. Lovell (P. R. R.), Thos. Adams (Wabash, St. L. & P.) and J. W. Craig (C. & S.) to whom was referred the question of elevation of curves, reported as follows:

1. What should be the elevation per degree for a speed of 30, 40, and 60 miles an hour?

Would recommend as a general elevation, ½ inch per degree for a speed of 30 miles an hour and under, and 1 inch per degree for 40 miles an hour and over, not to exceed ordinarily a total of 6 inches. An occasional deviation from the above may be admissible when extraordinary circumstances

a total of 6 inches an absolute necessity, in which case 8
ever be exceeded. This excessive elevation should be on a
single track, or on a descending grade if on double track,
oper movement of freight trains.
ethod of elevating for change of curvature in reverse

vation for change of curvature in reverse curves, begin at
erse and flatten both curves by throwing the track toward
he curves for a distance about equal to speed multiplied
f curves, assuming speed at not more than 40 miles an hour
art of this report), and being careful to have curvature
ase and run into regular alignment of curve without
ply a string, whose length is equal to speed plus one-half
d beyond the flattened end of the curve, and measure the
s for the purpose of correcting the alignment. Continue
ck until a regularly increasing middle ordinate is obtained;
track to a perfect level at the point of reverse. Again
from the point of reverse, measuring the middle ordinates
levate the outer rail at each point where ordinate was tak-
qual to the middle ordinate at that point. In this way a
sing elevation can be obtained for a regularly increasing
curve beyond the flattened approach should be elevated
ner as the approach.
guard rail braces be used on curves· if so, when and

braces should be used only on sharp curves of about six
ward, or where the general condition of the cross-ties is
l and traffic heavy. And when used should be placed at
tly opposite, and at least three braces to a rail (the exact
ng on circumstances), and spaced evenly, so as to preserve
nment and gauge of the curve.

D. H. Lovell,
Thos. Adams,
J. W. Craig,
Committee.

the report was accepted, and the committee dis-

—The question of elevation of curves is now be-
ention for discussion. This is a question we all
less to do with. I would like to hear from some
aster—that is, some roadmaster who has the un-
of taking care of a very crooked track.
ig—As a member of the committee on the eleva-
I have, with my co-members, submitted what we
nd should be very glad to hear from other mem-

bers. You have not all straight lines. We want to know whether we are right or not. We recommend the views expressed in our report as the best, and if any members differ from us, we will be glad to hear from them. Probably we shall see the error of our ways then. There is no use for me to discuss it, because we have discussed it in our report. I hope that no member will be at all delicate about talking on this subject, because that is one way to get information.

Thos. Adamson—O. & M.—I have had considerable experience in curves, and I recommend the adoption of this report. I am for the rule of 1 inch to a degree, and not exceeding 6½ inches elevation.

The Chair—Do you elevate an inch to a degree for all rates of speed?

Mr. Adamson—We have to be governed by the fastest speed. If we could govern the rate of speed, we would need less elevation. But where we are running 40 to 60 miles an hour, I recommend an inch to the degree.

B. Caffrey—Lehigh Valley R. R.—After looking over this report, the first part of it seems to be practically right, as near as I can get at it. It seems to cover the whole ground. An elevation of ½ inch to a degree for a speed of 30 miles an hour or less, and an elevation of an inch to a degree for any speed of over 30 miles an hour, seems to be a very good practice. That is about the rule I observe, and I am one of the "crooked" roadmasters alluded to. But my practical experience is that there is no cast iron rule by which you can elevate curves. As the gentleman who last preceded me said, you must fix them so they ride right at the fastest rate of speed, and have the least oscillation, and at the same time not have the rails crowded on the inner or outer side. There are times when an elevation of one inch to a degree on the lighter curves is not enough—for instance, you elevate a 1 degree curve 1 inch; that is hardly noticeable, and it is desirable to elevate a greater curve more than an inch to a degree. It would be impossible to carry out this rule. Therefore you must stop at a certain maximum elevation; and I think, as stated in the report, that 8 inches is nearly correct, as nearly as I can ascertain from practice. It is not desirable to have curves elevated more than 8 inches, very few should be that much. Because if curves are 10 2 degrees, a rate of speed exceeding 40 miles an hour should be run over them. I know greater speed is made over them times, but it should not be done.

Now as to the rule given in this report, covering reverse ves, I don't know from a casual glance at them that I under- ad them fully enough to comment on them. The principle is arently right. I have not had time to go thoroughly through and probably would not have time during this convention, ause I could not give it the necessary attention. My experience that the great trouble with curves is not so much in the eleva- as in a true line and surface. Your elevation does not amount so much in going around a curve if you have a perfect line surface. If you have a slight elevation you throw more ght on the outer rail. If you have too much elevation you ow the weight on the inner rail; but in every case your trains go around those curves practically without feeling it, if the and surface are right.

The most important consideration after the elevation is a true and surface on the curves.

Mr. Craig—The gentleman says that he thinks 1 inch is much for 1 degree.

Mr. Caffrey—I said it was not enough.

Mr. Craig—I misunderstood you.

J. A. Dodson—I agree with what the member has said with ference to the elevation of curves; but there is one matter men- ioned in that report I would like to have discussed more thor- ughly, and that is the subject of rail braces.

I have had some little experience in that line, and I want to give you the benefit of it. I found when we put on heavy passenger engines, that the outside rail on a 5 degree curve opened and the inside rail remained intact. I attributed this to the high rate of speed.

The Chairman—What was your elevation?

Mr. Dodson—Four inches on a five-degree curve. About six months afterward we put on the consolidation freight engines, and they went over these curves at a very low rate of speed. Then I found the inside rail opening. I had 6 braces on the quarters and centers. I afterward changed them and put the braces on the first tie from the suspended joint, and I found they held much better.

The Chairman—Did you put those braces on each tie of the suspended joint?

Mr. Dodson—No, sir, the first tie on the outside. First I only had them on the outside. After we put on the consolidated engines I put them on the inside of the curve, the third tie from the joint—which would bring it about a quarter away. They didn't give satisfaction and I changed to the first tie from the joint,. from which I obtained better results.

The Chairman—In doing this did you increase the number of your braces?

Mr. Dodson—No, sir.

The Chair—Your track was laid with broken joints, was it?

Mr. Dodson—Yes, sir.

Geo. W. Larr—Wabash, St. L. & Pacific—As far as guard rail braces are concerned, I do not think it is necessary to have them on the high side of the curve. It is the low side of a curve that invariably goes out. About a year ago I had a little experience in that line. I had the guard rail braces on the high side and the inside rail gave way. Then I put the braces on the outside of the inner rail, and they now give entire satisfaction. It was a 22 degree curve.

Mr. Shea—C. N. O. & T. P.—I would like to ask the gentleman a question. You spoke of a 22 degree curve?

Mr. Larr—Yes.

Mr. Shea—What is the elevation?

Mr. Larr—About 6 inches.

Mr. Shea—What gauge?

Mr. Larr—About 4 feet 10½ inches.

Mr. Shea—What is your standard gauge?

Mr. Larr—4 feet 8½ inches.

J. H. Preston—C. R. I. & P.—I have heard this report of the committee, and in a practical way I have but little fault to find with it. It is impossible, we all know, to adjust a curve for all speeds. We have to simply ascertain what is safe fastest speed that our train is likely to run. I have fou experience that three-quarters of an inch elevation to the degree is sufficient for a 45 mile rate of speed. The most of our first-class roads are now making 60 miles an hour; and I find that for a 60 mile speed an inch elevation to a degree is about what we practically arrive at for safety. I make it a practice to commence the elevation for a 1 degree curve 50 feet from the end of the tangent; by this method I find that you can hardly tell when a train strikes a curve, if your track is in good surface, gauge and line.

I do not believe it is necessary to put guard rail braces on any curve below 7 degrees.

Mr. Shea—What do you mean by going back 50 feet?

Mr. Preston—I mean for each degree of curvature, on tangent 50 feet and get full elevation at point of curve.

S. L. Swinney—T. P. & W.—Mr. President, I believe we will all agree with Mr. Preston that every curve should have as much elevation at the point of the curve or at the end of the tangent as at any other point in the curve, but I rather think he is a little extreme in his figures when he says he would go back 50 feet on his tangent for every 1 degree to commence his elevation. That would necessitate going back 800 feet for a 16 degree curve, which would be unnecessary. I think at 150 feet you can get all the elevation necessary for a curve to have to strike the point of the curve or leave the tangent.

Mr. Craig—I understood Mr. Larr to state awhile ago that he had on a 22 degree curve a derailment—before he had guard rail braces—and that he then found it necessary to use the braces.

Mr. Larr—I stated I had the guard rail braces on the high side, and the consequence was that the inside rail turned out.

Mr. Craig—It was the spreading of the track that caused the derailment?

Mr. Larr—Yes.

Mr. Craig—The effect of the tonnage was greater on the inside or lower rail than it was on the outside?

Mr. Larr—Yes.

Mr. Craig—The spreading of the rails was the cause of the derailment?

Mr. Larr—Yes.

Mr. Craig—And it was overcome by using the rail braces on the lower side?

Mr. Larr—Yes. Where the track is well tied you hardly ever see the high side crowd out.

President Burnett—The gentleman said the engine would regulate itself to the curve?

Mr. Larr—Yes, I did.

President Burnett—I don't know but it will; but it occurred to me it might more readily regulate the track to itself than itself to the track.

Mr. Larr—Well, that was my meaning, but I didn't express it in that way.

A Member—I would like to ask the gentleman how he spiked his curve—whether to gauge?

Mr. Larr—No, sir, not to gauge. Leave it about an inch wider than gauge. No curve ought to be spiked to gauge.

Thomas Adamson—O. & M.—Mr. President, I find the statement made by the committee as near correct as you can get it. A half an inch elevation is not enough for a speed of 40 miles an hour. As your curvature increases you must increase your elevation to accommodate the speed of your trains. If you have a speed of 50 or 60 miles an hour and a 7 to 8 degree curve, you would have to follow that with an inch to a degree, in order to get the fast trains over safely. We have some very steep grades. On these neither freight nor passenger trains can make much speed. I have more difficulty in keeping the lower rail in place than the upper rail. I have never found it necessary to use rail braces on the high rail. The best we can do, the rail will invariably cut into the tie, and the rail turn out. I refer to the inside rail.

Coming back to the elevation of curves, the report of the committee has been made out with more care, time and thought, than any member can give to it here at present. The report, except as to guard rail braces, comes very near my idea. I would put the braces on the lower rail.

President Burnett—I would ask Mr. Caffrey, in spiking your 4 degree curves, do you spike them loose? If so, how loose?

Mr. Caffrey—Not a 4 degree curve. When they get above at we do generally.

The Chairman—What reason, basis or rule do you have for at?

Mr. Caffrey—The only reason I can give for widening the gauge on a curve at any place is to allow the engine to adjust itself a few times, so as to avoid straining the rails. The driving wheels on the engine are in a rigid frame. The forward wheel of a locomotive having two sets of drivers, the flange of the forward wheel will press on the outer rail of the curve, and it has a tendency to straighten itself; consequently the wheel presses very hard against the inner rail, while the flange of the rear wheel will press against the outer side of the curve. The engine has a tendency to move in a straight line.

As to guard rail braces—there is no one in this convention who objects to them, therefore I would say, use them whenever necessary, and not otherwise. They are desirable and necessary sometimes.

President Burnett—You construct a curve, and your alignment is very nice, and your iron or steel rail is curved regularly and laid. In passing around it after it has been used some time where do you find the inside rail defective, at the joint or at the quarters?

Mr. Caffrey—Defective or crowded?

President Burnett—Crowded a little out of line.

Mr. Caffrey—Well, with a light rail you find it at a short distance either side of the joint, but when you come to get a heavier rail you don't notice it.

C. E. Jones—C. B. & Q.—When I took charge of the division I now have charge of, the rails were not curved, and I had a great deal of trouble to keep them from spreading. Since then I have taken these rails up and laid 66 pound rails, and curved them. I find no more trouble now with my joints than I do at any other point; and in putting up curves and spiking gauges on sharp curves, I think any roadmaster who has a bad point or sharp curve where trains run fast, after he has put his tracks in shape, will take especial pains to observe the working of that particular piece of track, and if one degree of elevation is not enough he changes it to another; and if his track is too narrow, or spiked too close and works wrong he changes his gauge. I have done it, until I got it to run right and ware both rails the same.

JOSEPH HAYWARD—K. C. St. J. & C. B.—Mr. President, I have some curves on my line and straight track too. I watch my curves until I get them to a point where I think they will stand pretty well. On one section of our track, where trains run from 30 to 50 miles an hour, I have a curvature of from 1 to 9 degrees. They never pay any attention to slowing up around them. They run around them at the rate of 50 miles an hour. I have no curve elevated over 4 inches. As was said, a half inch on a 1 degree curve would not be felt, or even an inch on a 1 degree curve, but after you get up to a 5, 6, 7 or 8 degree curve, I have found 4 inches as much as necessary. I find it stands better, and there is no uncomfortable motion at all either in the car or on the engine. I find when I get too much elevation it don't do so well. The inner rail is apt to give way, and I came to the conclusion that 4 inches was about the best. I use no guard-rail braces, and I don't find any trouble in holding those curves in place. In the yard, where we have curves up to 18 degrees, we use braces. When I find a rail canting, I have the section men take it up and put another in its place. I look well to the curve when it is laid, so that it will stand to whatever degree.

MR. CRAIG—What is the weight of your rails?

MR. HAYWARD—Fifty-six pounds. It is spiked 14 degrees, 4 feet 9 inches; 15 degrees, 4 feet 9½ inches; and 18 degrees, 4 feet 9½ inches. Four feet 8½ inches is the standard gauge.

C. E. JONES—There is one point, I think, overlooked by railway managers at the present time, and that is in regard to the rails we use on heavy traffic roads. The base of the rail is too narrow, and the hight too great. It gives too much of a leverage for the turning of the rail.

O. S. JORDAN—Michigan Central—Mr. President and gentlemen: Safety is the first thing to be taken into consideration on all track work. I am a 1 inch to the degree man up to 6 degree curves for fast running. I have never yet been on a railroad where trains did not run 50 or 60 miles per hour when late. I think all curves should be elevated for such speed, but if there are railroads where they do not allow any trains to run to exceed 30 to 45 miles per hour, I am in favor of elevating accordingly. For a speed of 30 miles per hour, I would give ½ inch elevation to each degree of curvature. For a speed of 45 miles per hour I would give ¾ of an inch elevation, and for any speed more than 45 miles per hour I would give 1 inch elevation.

Elevating a curve alone is not sufficient to make a good riding curve. You must have your curves as near perfect lines as possible and the approaches or ends correctly run in.

Good elevation, line and approaches to curves combined, are what make good curves. This is one of the most important questions, if not the most important, for us to consider. All trunk lines are running fast trains and have been increasing their speed year after year, and no doubt will continue to do so until a still higher rate is reached. This question should be thoroughly discussed before being voted upon.

My experience is that the ends of all curves should be compound. Starting at point of curve, make your curve for the first 40 feet 1 degree, for the next 40 feet 2 degrees, and the next 40 feet 3 degrees, and continue on in this manner until you reach your regular degree of curvature.

The elevation should be given in the same manner, level at the point of curve, 1 inch elevation at the first 40 feet, 2 inches at 80 feet, 3 inches at 120 feet, and continue on in this manner until you reach your regular degree of curvature. Taking this at a glance no doubt some of our members will say it is wrong not to give any elevation at point of curve. But if they will think for one moment that you will get 1 inch elevation for every degree of curvature, and that the elevation increases just the same as the curve sharpens, I think they will see the point. My experience is that a 30 minute, or a 1 degree curve properly lined and surfaced without elevation, will ride as well as with elevation. Curves of more than 1 and up to 6 degrees, properly lined and elevated as before mentioned can be approached and run over at the rate of 50 miles per hour without any bad effects. You can run over these same curves 60 miles per hour with safety, but you can plainly notice the swing of a train in turning a 6 degree curve at that rate of speed. If I had charge of the construction of a new railroad, I would have all the curves run in in this way, and would have nothing sharper than a 6 degree curve, where it was possible to avoid it, and as much less than 6 degrees as possible. When I took charge of the eastern division of the Michigan Central Railroad as roadmaster I found plenty of curves from 3 to 6 degrees, some of them reversed curves or nearly so, with but 200 feet of tangent between them, and none of them compound at the end. I went to work and compounded them by the eye. Some of them I threw from 1 to 2 feet at the point of curve, and one of them I threw 2 feet 10 inches. In order to do this, I had to commence well back in each curve and swing in the ends of them. This of course sharpened up curves a little at the place of beginning, but so very little that it could not be noticed. Where you have curves with 200 feet tangents between them, you can work them better. Commence back in curve 100 or 200 feet, as the case may require, and swing your curve out, to a point 100 feet on tangent, or one-half way between the two curves; from this point swing track in the opposite direction and compound the other curve the same as first one. This gives you a compound and reverse curve, which experience has taught me is much better than to have two sharp curves not compounded and with 200 feet of tangent between them. In curves that are not compounded, the best method I know of to elevate the approaches of such curves is to first find the regular degree of curvature, give the required elevation at this point, which will be 1 inch to the degree, then run your elevation out from this point 1 inch in every 40 feet. This is a very simple and correct way of starting your elevation. It makes no difference how much elevation you have in any curve, you can not prevent the wheels from hugging the outer rail when running at a high rate of speed. It makes no difference how little or how much elevation you have at point of curve on a 4, 5 or 6 degree curve, or how far back on the tangent you start your elevation, if a curve is not compounded, you will get a sudden side jerk or swing.

At our last meeting an objection was raised against compound curves because it was thought the trackmen could not keep them in proper line. If such should be the case, it could be easily remedied by having center stakes set and driven down to stay, which would enable the trackmen to keep their curves always in proper line. For section men to find the degree of curves by stretching a cord 60 feet long on the inside of the outer rail and then taking the middle ordinate for the elevation, in the most of cases I do not think it accurate enough. Take, for instance, a curve that has not had center stakes set since it was first laid; it will be found to have ½ dozen or more degrees of curvature and by the cord would have ½ dozen or more elevations.

Sharper curves than 6 degrees I would elevate ¼ inch per degree beyond a 6 degree curve, but would not exceed 7 inches elevation to any degree of curvature.

G. R. **Campbell**—T. & O. C.—I would like to know how the gentleman can make a compound curve out of a regular curve.

Mr. Jordan—I said I sharpened my curve at the place of beginning.

Mr. Campbell—I don't see how you can make it ride any better by compounding a curve that was not compound.

Mr. Jordan—You will get a sudden jar on a regular curve.

Mr. Campbell—How do you do it—with your eye?

Mr. Jordan—You can't do it exactly with your eye; but you can do it so near it can't be felt on the train.

A. D. **Adams**—W. St. L. & P.—There is as much in the gauge of a curve as there is in the elevation. A great many section foremen go for a wide gauge. It is a great mistake. The more snugly you can gauge up a curve the better it rides, just giving the drive-wheels room. Whenever you get them too wide you slam around. Surface it well, and line it well, and then gauge up well, and you have a good curve.

Mr. Caffrey—The remarks of several gentlemen heretofore have suggested many things to me in relation to curves that I didn't think of when I spoke before. My friend, Mr. Jordan, made some good suggestions with reference to curves. He made some that I don't know to be entirely correct. However they are worthy of consideration. One of them was in relation to engineers giving center stakes for curves. Engineers are very good, but you can't always get them for that purpose when you want them. It is very desirable to have stakes driven by them. But supposing you do have center stakes given you; they give them no closer than 50 feet, except on very special occasions, when they give them at 25 feet. They will not do that very often if they can avoid it. They do sometimes give them at 100 feet. Many section men could line a track if they had center stakes 100 feet apart; others could if they had them 50 feet apart; but there are a great many who could not line a curve with either distance. They would probably get them right at the very point where the stakes were, but it is a question in my mind whether they would get a true circle between those two points. I have often seen where they did not. Now how can a curve be lined up without the aid of an engineer, or between the points given by an engineer? One way that suggests itself to my mind, is to get the middle ordinates of the line. It don't make any difference how long your cord is; get the middle ordinates exactly alike and you have got a true circle. If you go around the circle once and get the ends of your cord at a certain place, and center at another, and you follow that around and put the ends of your cords where the center was, then you get two ordinates. It is very questionable in my mind whether a section man who understands the use of the string and ordinates will not, by trying, get a true circle in this way. I think it is easier for him to get it in this way than any other. No man can get a true circle with his eye. That is out of the question. You may guess at it, but you don't know when you have done whether it is right or wrong.

Now, in reference to the remarks of Mr. Jordan as to compounding curves, I do not know that the majority of those present understood him as I did. Instead of compounding curves, it is desirable to flatten them on the ends. In my experience, the trouble is in striking the curve at first. If you have a full degree of curvature right at the point, you certainly turn there very abruptly. It is just the same as turning an angle; the flatter you make your curve, the easier you will turn around it.

f you flatten them on the point where you strike them, you can o on them gradually; in some instances you do not feel it at all. hat is what I think the gentleman meant by compounding rves; at least, that is the understanding I got from what he id, and this has been my practice for a number of years.

Mr. Jordan—That is about what I meant by compounding rves.

Mr. Campbell—I would like to ask how they flatten the rve at the tangent?

Mr. Caffrey—I did not mean to say, or be so understood, at I flattened the curve at the tangent. We do not flatten the ngent. The tangent is a straight line, and a curve is a part f a circle. We flatten the beginning of the circle from the end f the tangent until we get a certain distance in on the circle.

By request of the President, Mr. J. W. Craig assumed the hair.

C. Buhrer—C. St. L. & P—I have studied the matter of curves for the past four or five years. Some say they do not believe in widening the gauge on curves. I believe, myself, we should have a true gauge; I believe in widening the gauge a little on a sharp curve, but give it a true gauge in widening. We have a curve of 5 degrees. I had a gauge made especially for that curve, and made a quarter of an inch wider than our standard gauge. In the first place, I gave that curve three-fourths of an inch to a degree, and found our trains were running at a fast rate of speed, and it wasn't quite enough, and we then gave an inch to the degree, and by widening the gauge a quarter of an inch, I found that curve stood in better line than it ever did before. Besides that, we put on rail braces to keep it in gauge.

The Chair—You said you did not have elevation enough. How did you find that out?

Mr. Buhrer—By the action of the train.

The Chair—What was the peculiar movement of the train?

Mr. Buhrer—More of a side swing than I thought was necessary. I increased the elevation to stop the side motion. The first thing we want is a true gauge and a true surface.

The Chair—You think a true line and surface on a curve are very necessary for a train *to ride smoothly*?

Mr. Buhrer—Yes, sir.

A. D. Adams—W. St. L. & P.—The question I want to see settled here is, what is the true elevation, and how do you prove you have the proper elevation?

The Chair—We are now discussing the subject, and will try to reach the correct conclusion.

Mr. Buhrer—We experimented, and as we increased the elevation, the easier the track rode.

Mr. C. E. Jones—We had a 5 degree curve at the end of a very heavy grade. The engineers were at me to do something with that curve. It had then 3 inches elevation. I changed the elevation to 5 inches, and have maintained it and have heard no complaint since from the engineers. When the engineer is satisfied the track is all right—you can bet it is.

The Chairman—There seems to be considerable difference of opinion as to what is the proper elevation. The committee has submitted its report, and it has been discussed by different members, and as you don't all agree as to what is the proper elevation, I would be pleased if some member would draft a resolution recommending what would be the proper elevation.

President Burnett—Mr. Chairman, all the gentlemen who have expressed themselves seem to be inclined to one opinion. They differ a little in their methods of forming that opinion, but they all tend to an inch to a degree for a speed of 40 miles an hour and upward, and ½ inch to a degree for any less rate of speed than this. I am inclined to think whatever may be said hereafter will tend to the same opinion. The method of ascertaining the degree, with cord and string and middle ordinates, seems to be about the same; and I would move you, sir, that this question of elevation of curves be referred to the standing committee—to report to-morrow morning at half past eight o'clock.

Carried.

An invitation from the Elliott Frog & Switch Manufacturing Company, of East St. Louis, to visit their works was accepted, and a vote of thanks extended.

On motion the convention adjourned until next morning at 8:30 o'clock.

WEDNESDAY'S SESSION.

The convention met at 9 o'clock A. M., President Burnett in the chair.

President Burnett—Gentlemen, yesterday after the discussion of the question of elevation of curves, it was referred to the standing committee for report. This committee have reported, and the secretary will please read first the original report and then that of the standing committee.

The secretary read as follows:

To the President and Members of the Roadmasters' Association in Convention:

Gentlemen—Your committee, appointed to report on the question of elevation and curves would respectfully recommend the adoption of the report of the committee on that subject read at the first session of the convention.

R. A. Houghton,
C. E. Jones,
F. X. Galarneau,
S. L. Swinney.

Mr. Adams—I move the standing committee's report just read be accepted as the sense of this meeting, and that the association recommend the adoption of the original report.

Carried.

FOOT-GUARDS.

President Burnett—The committee on foot-guards having failed to report by reason of disagreement, and the chairman having requested that the committee be discharged, the question was referred to the standing committee for a report. They have made their report, which the secretary will please read.

The secretary read the standing committee's report on the question of foot-guards as follows:

To the President and Members of the Roadmasters' Association:

Gentlemen—Your committee, appointed to review the communications submitted to your regular committee on foot-guards, would respectfully submit, as their opinion, that some kind of a foot-guard is desirable, and that, from the best of our information, we think the Hart foot-guard is the best at present, and would respectfully suggest that the association recommend the same.

R. A. Houghton,
C. E. Jones,
F. X. Galarneau,
S. L. Swinney.

On motion of Mr. Adamson the report of the committee was accepted and the committee relieved from further consideration of the question.

On request of President Burnett, J. W. Craig took the chair.

President Burnett expressed a desire to hear from the Preston, on the subject of foot-guards.

Mr. Preston said: I was appointed one of a committee two years ago to investigate the matter of foot-guards. I was unable to obtain any information scarcely regarding the matter, depending somewhat on the work of the other two members of the committee, who also failed to obtain any. I obtained some information, but not enough to make an intelligent report. During last year, I have looked the matter over closely, and wrote to about twenty-five or thirty superintendents of roads. I think about fifteen of them were in favor of the Hart foot-guards, and I came to the conclusion, from the evidence I could gain, that there wasn't anything except the Hart foot-guards that had had anything approaching a practical test. I think it is the best thing we have now in use.

Mr. Swinney—Mr. Chairman, before proceeding any further in this matter of foot-guards, it has been suggested that perhaps we had better consider the question a little further, and for that purpose I move a reconsideration of the vote adopting the report of the committee.

The Chair—The adoption of the report would not compel any road to use the Hart foot-guard.

It is moved and seconded that the vote adopting the report of the committee on foot-guards be reconsidered.

Mr. Burnett—I would like to make a few remarks on the motion, if in order.

The Chair—You did not vote on the motion either way?

Mr. Burnett—No.

The Chair—Then you would not be in order.

Mr. Swinney—I would like to hear from the gentleman.

The Chair—Proceed, if there is no objection.

President Burnett—In the first place this report is simply ntended to bring the matter before the association. The re-ort was accepted, and that brought the matter before the con-ention for discussion. After discussion you can do with it as ou please. The committee's report cuts no figure in the matter t all, it simply brings it before the convention. If you reconsider the motion to accept, and it prevails, then the question will receive no further consideration at our hands. It is open now for discussion, and when the members have fully discussed the question of foot-guards, they can dispose of it as he majority may think proper.

Mr. Swinney—I did not understand it in that way. I will ithdraw my motion to reconsider.

The Chair—The fact of the report not being adopted leaves still before the convention.

Mr. Burnett—Yes. The report of the committee was accepted d the committee discharged. This leaves the question of foot-ards before the convention. Yet it may be recommitted, but n not be reconsidered.

The Chair—Now the question of foot-guards is open for dis-ssion. I would be pleased to hear from Mr. Burnett.

Mr. Burnett—I hold in my hand letters from general perintendents and others; we cannot go wrong in this mat-r in recommending a foot-guard. It seems desirable to use omething in this line; now what is the best? Men who have ever used any foot-guard other than the plank filling or cinders, hould not vote against any other systems that have been used by oadmasters who have had practical experience with plank filling and cinders, and find other devices far better. I look upon this association as an intelligent body of men, and they have not come here to tell what they use, and all insist it's the best. But we have come here to discuss questions and learn what is the best. How can a roadmaster stand up here and vote against any device that he has never used, against men's views who have used the device he advocates, but who find others far superior to it?

These letters which I hold in my hand are from general superintendents and roadmasters upon the foot-guard question. All seem to recommend the use of a foot-guard, except two, both of which were written by members of the committee with Mr. Preston. The secretary will please read Mr. Wright's letter to Mr. Preston.

The letter was read.

James Sloan—C. & E. I. Ry.—That letter expresses my sentiments.

Mr. Burnett—Mr. Sloan, one of these letters is from the general superintendent of the C. & E. I. Ry. Mr. Wright may be right in his sentiments as well as by name. They are undoubtedly an annoyance to roadmasters. I know it from experience. We have used the blocking on the road I am connected with, and we have used the Hart foot-guard. Of the two I would recommend the Hart foot-guard. I think it is easier kept in place than the blocking and does not cost any more. Any roadmaster who receives instructions to use a foot-guard, should use it without a murmur, and should employ every effort in his power to make it a success.

In this bundle of communications, are represented more than forty roads that do recommend a foot-guard; not from the roadmasters, but from the general management of the roads. Now shall any roadmaster say these gentlemen do not know their business? It is wrong. Let them make their report to the superintendent, and if they don't like the foot-guard, they can say so in their report. Here is a letter written from the superintendent of a road to his roadmaster, in which he says: "I desire to call your attention once more to the importance of watching your blocking in your frogs and switches. I wish you to impress upon the minds of your foremen that this is the most important duty they have, and that no excuse whatever will be taken for a failure to have their frog, switch and guard rail properly blocked. I shall order the discharge of the first foreman and every foreman who neglects this part of his duty."

Can this association afford to throw all this aside, simply because Mr. Cox and Mr. Wright say foot-guards are a nuisance? That is not all. It is a proper question for consideration. It is a question of a great deal of importance to life and property.

Many states have laws compelling railroad companies to use them. Then must we say it is a nuisance? Again, however much of a nuisance it might be, if I knew that by the use of it I would save the life of one man in a life-time, I would willingly suffer the annoyance.

We have used them on the Rock Island road five years, and have not had an accident happen a man from being caught in a switch or frog during that period. We might not have had if we had'nt used the foot-guard; but the year previous two men were killed, and another lost both legs by catching his foot in a frog. The management then adopted the Hart foot-guard, and we make a great effort to keep every switch and frog well blocked.

Now when we recommend a foot-guard, let it be a good one; if there is one better than the Hart guard let us recommend it. For should we recommend an inferior one we should be conveying false impressions, and taking away the natural care switchmen and others would have if a foot-guard was not used.

JAMES SLOAN—I am opposed to the adoption of this report, for the simple reason if we adopt it and any accident happens to the employes of the road, the company will be responsible, and I don't think we ought to adopt any particular kind of foot-guard.

MR. BURNETT—I will say, I don't think it is in the power of this association to adopt anything, all we can do is to recommend. Then if our management does not see fit to adopt it, we can not help it. I don't know of a man in this room who wants it. I do not. But inasmuch as it is a question of importance we should not say it is of no value. We can recommend anything, but can adopt nothing.

C. E. JONES—C. B. & Q.—I think the question of foot-guards is one of vital importance to switchmen and train men. The road I am with is very particular and very positive in its orders that we keep every spot blocked in a good safe manner. We do it with a block we make ourselves. The business of railroad men is dangerous, and especially that of switchmen; and if we can help them by rendering their business more safe by blocking our switches and frogs, we are doing something that will be to their benefit. If one of the men on our road sho lose his life or limb by my neglect in failing to properly bl my frogs and switches, my conscience would trouble me. I hard for us to say what block is the best; but surely some de ought to be used. I saw the Hart foot-guard, or something it, in the Bridge Company's yard last night. I think it is a g guard, so far as I know. Our blocks answer the purpose. have never had a man caught on my division where we have these guards in. Yet I like the Hart guard from what I of it.

Geo. Wail—A. T. & S. F.—Our roadmasters have the same structions Mr. Jones has just referred to. Our blocking is m of plank. It is run through a machine and made to fit, so flange of the wheel will pass over without chewing or cutting We have used cinders, but I find it takes just as long to pick frozen cinders as it does to knock a block out.

A. D. Adams—W. St. L. & P.—We put in a piece of pl across the end. It is cheap and easily kept in proper c dition. Where the ties are bad and go down, I find cinc much better than our plank blocking.

J. A. Perry—Virginia Midland—We use nothing but cind We have had no accident to brakemen or switchmen since have used them on the road. We have used them two ye They are cheap and easy to take care of.

Mr. Burnett—Do you know what it costs you to keep cinder business up?

Mr. Perry—Well, it costs us nothing, because we gener have enough cinders in the yard to use. When they clean yard they fill the guard rails and frogs.

O. S. Jordan—We use blocking sawed out to fit all the ferent angles of frogs and switches. This is the only experie I have had in frog blocking. I think it must be cheaper t this foot-guard, but I would like to hear some more from th men who have used cinders. It seems to me cinders must the best and cheapest thing, if they can be used with safety.

Joseph Hayward—K. C. St. J. & C. B.—Our instructi are that all guard rails must be blocked. Our patterns are saw out. They cost but very little. Each foreman has positive structions when he finds one split or broken to replace it. In 1875 we had a brakeman caught in the yard. We were making a new yard. I took it upon myself, without any instructions from any one, to do the blocking of all frogs and switches. The blocks are cut down so the flange scarcely ever touches them, except it is very badly worn. They are made so they will lie snugly in their places. We have never had a man caught since. We were then under the management of G. H. Nettleton. He gave instructions that all frogs and switches should be blocked. I don't know that a common block is the best. If there is anything better I would like to hear of it. I would not care for the trouble if we could save one life. Something must be adopted to prevent the occurrence of accidents.

MR. BURNETT—I would move that all roadmasters who have foot-guards in use of any kind or description, stand up.

Eighteen arose.

MR. BURNETT—Now all who have no foot-guards or never use them, stand up.

Fifty-four arose.

THE CHAIR—All who are using cinders and no other device for foot-guards, please arise.

Four arose.

THE CHAIR—All those using the Hart foot-guard, arise.

Five arose.

THE CHAIR—All who are using the wooden block, arise.

Nine arose.

THE CHAIR—All those who use no foot-guard, arise.

Fifty-four arose.

THE CHAIR—All those who use blocking and cinders in connection, arise.

Four arose.

THE CHAIR—All those using any other device than those mentioned, arise.

None arose.

MR. BURNETT—I move that this association adopt the committee's report on foot-guards as the sense of this association.

Carried.

President Burnett resumed the chair.

The President—The next question in order for discussion is

BROKEN *vs.* EVEN JOINTS.

The committee on this subject submitted the following report:

St. Louis, October 12, 1886.

Your committee would respectfully report that the question of either "broken" or "even" joints depends upon the degree of excellence in which the surface of the track is to be maintained. Where there is but little attention paid to the importance of even fairly good surface, or where labor or material is withheld, whether from real or imaginary economy, with consequent detriment to the track, or where the nature of the road-bed or ballast makes it almost impossible to maintain good surface, the "even joint" is in all probability the better. But for good track, with good conditions, and with proper interest on the part of the proper officer and with fair but by no means extravagant expenditures for track labor, etc., the "broken joint" is the standard joint.

Respectfully submitted,
M. Philbin.
James Sloan.
D. H. Lovell,
Committee.

Thomas Dickson—C. & P.—I move the report of the committee be accepted, and the committee discharged.

Carried.

Mr. Dickson—Now to bring the question up before the meeting, I move the association adopt the report of the committee.

H. C. Caffrey—I think the report of this committee as to even joints is very well put, to wit: "Where there is but little attention paid to the importance of even fairly good surface, or where labor or material is withheld, whether from real or imaginary economy, with consequent detriment to the track, or where the nature of the road bed or ballast makes it almost impossible to maintain good surface, the even joint is in all probability the better." Very well, all but the last clause. "Where there is no ballast, etc.," or where there is no foundation, it is a question whether an even joint is the best, I have seen tracks in the East of entirely broken joints, and in no case have I seen a track laid with even joints as good as that laid with broken joints, even where the foundation is poor or soft. I can not now recommend the even joint, and I would like to hear the reasons of anybody present for recommending or wanting to use even joints.

JOHN SLOAN—I would like to ask this gentleman how he would do out on the prairie on a dirt road with the broken joints; where the joints go down on one side, the rail on the opposite side must naturally swing. It is one-third of the distance from the end of the rail to the end of the tie. It will naturally go down one-third on the center of that rail. What will you do in such a case as that, where there is no ballast but the black dirt of the prairie?

MR. CAFFREY—Is the result more serious to allow two joints to go down than one? Will your track ride easier?

JOHN SLOAN—Your track will ride easier if both joints go down than if only one does.

MR. CAFFREY—Can you practically keep even joints?

JOHN SLOAN—You can on dirt roads.

I have five or six hundred miles of even joints and I have no trouble in keeping them spiked.

MR. CAFFREY—Don't your rails vary an inch or more?

JOHN SLOAN—They are probably evener on the same track, than would be the case with broken joints.

MR. CAFFREY—How do you keep even joints on a light curve?

JOHN SLOAN—We don't aim to keep even joints on a light curve, we cut the rails.

MR. CAFFREY—If you have joints exactly even on a curved track you have got to cut the rail; otherwise you have no even joints. Practically speaking, there is no such thing as an even joint.

JOHN SLOAN—But this is not answering my question. Can you keep a better track with broken joints on a dirt road than with square joints?

MR. CAFFREY—My observation as to broken and even joints has not been in your western country. I have seen track laid on very soft mud. It was laid on such soil that at certain times it got very soft. I have seen it laid with square and with broken joints and the result was the broken joints were decidedly preferable in my opinion.

MR. BURNETT—Do you believe there will be any more oscill tion to the train from a broken than from an even joint?

MR. CAFFREY—If you allow the joints to go down, the broke joint would undoubtedly cause more oscillation.

THOS. ADAMSON—O. & M.—I have had twenty-five years' e perience with both mud and gravel track. I recommend the eve joint; it is cheaper to keep in repair, causes less oscillation, a I firmly believe makes a better track.

JOHN SLOAN—I think on our western roads, on the prairie, square joint is preferable.

PRESIDENT BURNETT—Here is a communication, which th secretary will please read.

The secretary read as follows:

ST. LOUIS, October 13, 1886.

TO THE PRESIDENT OF THE ROADMASTERS' ASSOCIATION, CITY:

Dear Sir—We, the undersigned manufacturers and merchants of S Louis, beg to tender to the members of your association and their ladies carriage drive through the city, and if acceptable, would name Thursda afternoon, October 13, 1886, leaving the Lindel Hotel at 2 P. M. Lunc included. Very respectfully,

ELLIOTT FROG & SWITCH CO.,
POTTER BOLT & PATTERN CO.,
and others.

On motion of Mr. Swinney the invitation was accepted.

By request of Mr. Burnett, Vice-President J. W. Craig too the chair.

PRESIDENT BURNETT—The gentleman says broken joints ar preferable on a good track. Now if the even joints are better o a poor track, why are they not better on a good track? It seem to me they ought to work equally well in both cases. I hav had no experience with broken joints, and I would like to get th views of everybody else. I will say this however; we have lai 20 miles this year with broken joints. This is the first. Bu it has occurred to me from the remarks that have already bee made that if the even joints are better on a poor track, the ought to be better on a good track. If there is any reason wh broken joints are preferable on a good track I would like to kno what it is. We have a good many hundred miles of even joints and we have only 20 miles of broken joints. The broken joint [illegible] very nice; but we have some even joints that are equally a good. For myself I don't know which I would prefer; and I would like to know why the gentleman recommends broken joints on good track and even joints for a poor track.

A MEMBER—Your experience on even joints ought to be pretty good.

PRESIDENT BURNETT—We have even joints on a couple of hundred miles of double track. We have had fair results from them. I think perhaps broken joints may make less noise if your bolts get loose. This has been suggested to me. But if this is the only reason let us keep the even joints, and keep the bolts tight.

A MEMBER—Do I understand broken joints have less friction on fast trains?

PRESIDENT BURNETT—No. At least I have never heard this point raised.

PERRY GRACE—C. M. & St. P.—We maintain that the square joint is the best on all roads, except where we have an old chair and a sand ballast. There we adopt the broken joints to keep the joint from tipping over on one side. In all other cases we adopt the square joint.

MR. JONES—Have you had experience with a broken joint track except with chair iron?

MR. GRACE—I have had experience for twenty-five years with all joints.

MR. JONES—With the broken joint?

MR. GRACE—Yes. I have had experience with the broken joint. I was in favor of the broken joint; but I found I was mistaken. I use the 40-inch angle bar and 67 pound steel. The broken joints cost most.

PRESIDENT BURNETT—Mr. Caffrey, will you tell me why a broken joint is preferable on good tracks?

MR. CAFFREY—Leaving out the question of crookedness of track, any gentleman here will admit you can keep your track with sharp curves in line better with broken joints than you can with square joints. That we will not take into consideration. My experience is that we want to avoid having low joints if there is any possible way to do it. Our particular business is to keep the joints from getting low. That is one of the points. In addition to this, practically speaking, it is impossible to get your joints even. If you break them at all, break them evenly, in the center or about there, within a foot or two. Then the line of the track--a straight track I am speaking of now—can be kept better, especially as long as you have got no low joints. And you have only one-half the liability to have low joints with broken joints that you have with square joints. You get two places—one on each side. Instead of having one low joint and one high center, you have got two low joints and two high centers. Now is it more desirable to have two low joints and two high centers than one low joint and one high center?

I rode over the railways leading from Buffalo on my way here. I rode over square joints one day, and I felt more tired than on the two previous days when I imagined I was riding over broken joints. I could feel the wheels striking the end of every rail. Now you can ride over the track of broken joints and you don't feel the wheel, for we splice our rails and bolt them tight, for there is no use of having splices on your rails if you don't keep them perfectly tight, or as nearly so as possible. You do not feel the wheel passing from the end of one rail to the other on broken joints; but you do almost invariably on the square joints.

A MEMBER--I would like to ask the gentleman if he has had any experience in keeping up broken joints on poorly ballasted tracks?

MR. CAFFREY—I have. I have had more experience in keeping up broken joints on all kinds of tracks than square joints.

MR. GRACE—What is your coupling? Angle bar, straight splice, or chair?

MR. CAFFREY—Chairs ought not to be taken into consideration by this convention at all. I have had charge of track with chairs on, but it is so long ago, it is not worth while to mention it. I think we ought not to take into consideration the ordinary chair. There is a certain kind of chair made now called a joint. It is not an angle bar or splice of any kind; but the chair I am speaking of is what was used twenty-five years ago. We use the angle bar.

PRESIDENT BURNETT—What do you think would be the difference in expense in keeping up broken and even joints?

Mr. Caffrey—One-sixth less in favor of broken joints.

Mr. Galarneaux—Have you had experience on broken joints ith double track?

Mr. Caffrey—Yes, sir. If you have light material for ballast it will push the ties around curves. Strong, heavy material, spiked well, will hold the ties.

President Burnett—I would ask if there is a gentleman present who has used the broken joint on what they call a poor track, a mud track, or unballasted track?

Joseph Hayward—K. C. St. J. & C. B.—I have had considerable experience in regard to broken joints. I have had 40 miles laid with broken joints. and 28-foot rails. When we have spells of wet weather, it is impossible—I don't care if we were to put ten men to the mile we could not keep up these joints. Every rail was bent, and even those on the opposite side were bent in the center. The rails in the joint were bent at the quarter, and they would spread out. The trains would roll from one side to the other. The gentleman said he felt tired going over those square joints; he would have felt sore in the shoulders had he gone over these broken joints. Finally we had to take up the track and lay even joints. We then got satisfaction. It didn't cost as much to keep it up. I never knew of a train getting off the track from low joints, where they were even and both low; but I have known of several derailments where the joints have been broken, caused by the swinging motion of the train.

Mr. Perry—Virginia Midland—Our road is laid with broken joints, with the exception of 10 miles that I laid two years ago with even joints for experiment. Our superintendent, being from the West, thought square joints the best. I find it is very much harder to keep up than broken joints. It won't stay in line around curves, and the bolts will get loose quicker. We use stone and gravel ballast. The square joints tip down, and as soon as they commence to tip down they begin to rattle. I am in favor of the broken joint, if you have ballast, and on curves by a big majority. We have grades of 75 feet to the mile. The track creeps some with broken joints, but not so much as with square joints. I have laid 10 miles, at four different parts of the road, of square joints, and we have come to the conclusion to *pull it and break joints* yet this fall.

C. E. Jones—On my division, practically, it is impossibl keep square joints on account of the heavy grades. All the s rails we lay now, we lay with broken joints; and, as far as experience goes, I would say it is far easier to make track on ballast or soil with broken joints. We use gravel and a li broken stone on the foundation. I have 35 miles of r track yet. My experience is that on sand, mud, or any kind track, I would prefer broken joints. If both joints are do your engine gives it that much harder blow than if only side is down. My splices and bolts stay tight better and d rattle so much with the broken joints as with the square joi We changed from square to broken joints about eighteen mo ago.

Mr. Hawkins—I have had an experience of twenty years v broken joints. Up to six years ago used them exclusively, since that time have had experience with both. Believe that v mud ballast even joint is the best on straight line. W joints are depressed together, the motion is that of a sp instead of a jerk, as is the case with broken joints. Prefer latter, however, with good ballast.

President Burnett—I find that the creeping of track ma even joints very uneven. The rails, too, creep unequally, north rail creeping about 2 feet to 1 of the south rail.

Discussion on the subject was then closed, after the pass of President Burnett's motion that the sense of the associa regarding this question is expressed in the report of the com tee on the subject.

GUARD RAILS.

The subject next to be treated was that of guard rails. committee appointed to consider this question reported as lows:

Your committee has the honor to submit to you its report on gu rails:

1. We recommend for the best interest of all concerned that gu rails, for all purposes, on main tracks should be 15 feet long, and sho have 9 feet of straight rail nearly parallel with the main rail; the c ter of the guard rail should be 6 inches ahead of the point of the fr and the straight part of the rail should be 4½ feet each way from the po

2. Commencing 2 feet 6 inches from each end of the guard r we recommend a regular curve, with a radius of 3 inches, which lea

a flange way at the ends of the guard rails 4¼ inches. We would recommend, in using steel guard-rails, that ¼ of an inch be planed off from the base of the inside of guard rail for spiking space. We also recommend that 3 sections of filling be used between main and guard rail, as shown in tracing, that it be held to its place by a bolt through both rails. This kind of a guard rail we would recommend for all kinds of frogs and in all places on the main line. But for yard purposes we recommend a 12-foot guard rail with a regular curve of a 20-foot radius, as shown in tracing, and secured in same way as main track guard rail.

G. R. Campbell,
C. E. Jones,
Committee.

On motion, the report of the committee was accepted.

Mr. C. E. Jones explained the tracing accompanying the report at length.

Mr. Hayward—I am using a 15-foot guard rail with slope of 4½ inches.

A Member—What is the idea of having a guard rail 15 feet long?

Mr. Jones—To give plenty of room to spike.

Geo. Wright—A. T. & S. F—We use a 10-foot guard rail, but we have not very much use for the extra 4 feet.

C. Buhrer—C. St. L. & P—I regard the guard rail mentioned in this report as a regular man-killer, for the reason you can get your foot in its full length, as the guard rail is described. Fifteen feet is short enough; 18 feet would be better.

O. S. Jordan—Our guard rails are very much like that shown in the tracing. We make them 15 feet.

On the suggestion of Mr. Burnett it was agreed that remarks on this subject should be restricted to five minutes for each speaker.

F. X. Galarneaux—I adopted this spring a 15-foot guard rail, with 4 feet parallel. I put the center of that 4 feet opposite the throat of the frog instead of opposite the point of it. I think 1 foot back of the point toward the main line is sufficient, and 3 feet the other way, so that when you get to the throat of the frog, where it is liable to climb, you have got the flange of the wheel up close. Your wheel is more likely, if it climbs at all, to climb gradually, and finally come back to its place. I would have it parallel only 4 feet instead of 10 feet.

The report recommends a guard rail with a curve all the w around. I recommend one with a parallel of 4 feet.

Mr. Caffrey being called for, said: Of course it is unnec sary for me to say what guard rails are for. You all know th are for preventing the flange of the wheel from going on t wrong side of the point of the frog. Now the question is, h to guard that point in the best and most substantial way in or to serve all the purposes for which it is required. The distar between the guard rail and the main track is governed, if t track is to gauge, by the opening of the throat of the fr They should be the same, whatever the opening between t point of the frog and the wing rail of the frog is; the gua rail should be the same distance from the main rail if the tr is to gauge. I see before me here two illustrations. What is t object of having a different guard rail in the yard from that the main line?

THE CHAIR—I will have to ask the chairman of that comm tee to explain that.

MR. CAMPBELL—In switching cars of different gauge in t yard they are more liable to leave the track than on the main lin A guard rail of the kind mentioned in the report we think wou be more liable to catch the trucks and straighten them up befo catching the frogs, as shown in the tracing. As far as I a concerned, I don't know as there would be any difference wheth it was used for main track or side track, but we have made ou report in that way.

MR. CAFFREY—As I look at it, a car that would require guard rail to be that far away, as shown in the tracing, wou not be fit to go over the road. I see no necessity for having t different styles of guard rails. I think one style is all that necessary. My opinion is that the line of the track on the f side being straight, all you want of a bend in a guard rail is the ends, and enough to clear the flanges of the wheel with striking. When you have that, you have all that is necess for a guard rail. My opinion is, guard rails should be the sa for main line and yards, where it is convenient to have them the same length, and I think this drawing represents the b form of guard rail that I know of.

Mr. Wright—What length of guard rail do you think best?

Mr. Caffrey—Fifteen feet. That makes a very convenient ngth. It is not desirable to have it much shorter.

J. T. Moran produced a model of a guard rail, and ex-lained its merits to the convention. He said: We use this uard rail on the Illinois Central. It is 12 feet long, 2 feet of he straight part of the rail being at the point of the frog; there re put 3 bolts through; and these bolts go through the filling too, s shown in the model. The filling is wood. It is a foot-guard as well as a filling.

Mr. Campbell—As I understand, it is a combination of guard rail and foot-guard.

Mr. Buhrer—Do you depend on the filling to prevent the rail from turning?

Mr. Moran—There are bolts in each end of this guard rail, and 3 in the side. When you get the main line in perfect line, your guard rail is there and don't get out of place.

Mr. Adams—Does not bolting it weaken your traffic rail?

Mr. Moran—It weakens any rail to put bolt holes in it. This guard rail has a support inside.

A Voice—Don't it weaken your traffic joint?

Mr. Moran—Yes. It does.

Adams—That is what I understand to be a half-moon guard rail.

Moran—There is a straight point of 2 feet opposite the point of the frog.

Mr. Preston—I see no objection to the use of the 15 foot guard rail. I think a guard rail 10 feet long is long enough for every main line and yard. I make my guard rails uniform all over my division, 10 feet long, 18 inches from each end; bend the rail 3 inches from a straight line; set the center of my guard rail 2 inches from the main rail. All our frogs are 2 inches. We use the rigid frog. Place the guard rail, at the point of the frog, 1⅞ inches from the main rail; the balance of it 2 inches, bending the rail 2 inches. It gives me 5 inches clearage at the end. Then I fill in with the Hart foot-guard. I make no difference with the yard or main line.

President Burnett being called for said:

The question is not what guard rail I use, or some ot party uses, but whether we can fix upon some form of a gu rail as a standard that we can recommend. During the discuss not one man has recommended anything except what he u himself. Each member was requested to bring a drawing print of a guard rail, one that he would consider desirable for purpose. Only two prints have been presented; both seem tc very good. Yet I observe that you all speak of the guard that is used upon the road you represent. Now it seems de able for this association to urge the importance of uniformity all track appliances, especially rails, frogs, switches and gu rails; and I see no way to accomplish this, or any part of until we can settle upon some one thing, and recommend it, each member of this association uses his every effort to pu into practical use.

I observe further, in the remarks made upon guard rails, t they should be placed in the track, giving the same flange that is used in the frog. Quite a number of the gentlemen remember in Chicago a year ago, insisted that a frog should spiked from ⅛ to ¼ loose gange. I am opposed to this. I beli that the gauge should be maintained; yet if you spike the frog make a loose gauge, you certainly must so spike your guard ra As we seem unprepared to recommend the adoption of any fo of a guard rail, I will move that the question be carried o to our next meeting, and a new committee appointed, and t each member be requested to bring a tracing or blue print his idea of a guard rail.

Motion seconded by John Sloan, and unanimously carried.

President Burnett then resumed the chair and announc that the next subject for discussion would be

STANDARD TRACK.

The secretary read the report of the committee on standa track as follows:

To the President and Members of the Roadmasters' Associati of America:

Gentlemen—Your committee respectfully submit the following:

1. What should be the roadmaster's aim; and are railroads getting best possible return for expenditures on track repairs?

2. What have you to recommend in the way of improvements at little or no additional cost?

1. The roadmaster's aim should be to have—1. Good drainage; that is, ditches wide and sufficiently deep and invariably clean. 2. Cross-ties of uniform length and properly spaced. 3. Surface at all times at least fair, and splice bolts tight. 4. Invariable and careful use of level board in raising track. 5. Uniform elevation of curves, and careful alignment of both curves and tangents. 6. Neat and clean appearance; freedom from weeds as far as the ditch line, and removal from the right of way of old cross-ties and other rubbish which disfigure the roadway and promote untidiness. 7. System as to time and manner of doing work and also thoroughness in same.

2. Your committee would recommend an annual track inspection of roadmasters on superintendent's division by the roadmaster and foreman of that division and also an occasional trip over part of the division by track foremen, separately during the summer months. Would also recommend that more attention be paid to the instruction of present and prospective foremen in the way of general information pertaining to maintenance of way; and that roadmasters themselves seek an opportunity to see what others are doing productive of good results.

Signed,

D. H. LOVELL,
JOHN DOYLE,
GEO. E. CAIN,
Committee.

The convention then adjourned until the next morning at 8:30 o'clock.

THURSDAY'S SESSION.

The convention met pursuant to adjournment, President Bu nett in the chair.

The question for discussion being the report of the com mittee on standard track, Mr. John Sloan said:

Mr. President, the report is right. I like it in eve respect. I think it is the way track should be kept. This r port is made out to conform to the way they have things o the Pennsylvania Road. Every road can not have things th way they have them on that Road. What the report sa in reference to instructing foremen and prospective forem is the very thing every roadmaster should aim to do. It is to th interest of the public and to the interest of the road to ha every man instructed in the best way possible in case they shou need such at any time. You don't know what day you will be need of a good foreman.

In regard to drainage, all roads should be well drained w good side ditches. They should be kept clean. With the l ited help we have in this country it is almost impossible at times to do this. We don't have a section gang of ten or tw men doing nothing else but cleaning up right of way. We to use nearly all the men we have to keep our track in passable condition for trains to go over. All roads should a have the road-bed in the condition named in the report to ties, it is my aim at all times, as soon as they are tak to burn them each day so far as they can be. We aim t the right of way of brush and weeds every year. The conditions mentioned in the report we can not at all tim ply with. I think no track man should go out on the do any kind of work, without his track leveler. It is on most important matters to be looked after. Without a le it is almost impossible to have a good road-bed.

Mr. Grove—Texas Pacific—Mr. President, the recommen- ation in the report, in reference to instructing foremen, is ne of its most important features, although the whole of is written very practically. I think it the duty of every oreman to see that his men are uniformly instructed as to his method. Thorough instruction will bring about system, which is very desirable. As to the question of spacing ties, I believe ties properly spaced and tamped will last 15 to 20 per cent longer than when put in in an irregular and uneven way. As to ditching, I am sorry to say none of us have our track as well ditched as we should. The recommendation in the report as to drainage is good.

Mr. Perry—Richmond & Danville—I approve of the recommendation with reference to drainage. On our road we are unable to get our ditches wide enough. I believe in having wide ditches well cleaned at least once a year. Keep the old ties piled up and burned. We save about half of our old ties for fuel at water stations. I pay $1.50 per cord for 36 inch pine wood. We only buy wood for kindling. We think it is cheaper to burn old ties.

I approve of the recommendation with reference to instructing foremen. I believe in going to the men myself and talking to them; I think it better than to instruct in writing. The more time a roadmaster can spend with his men, the better.

A voice—That depends on what kind of a roadmaster he is.

C. E. **Jones**—It is important to have your section foreman obey orders. My rule is that foremen must obey orders, even as I must obey the orders of my superiors in office.

As to tidiness, nothing looks better on a road than to have it clean and tidy. We are not all in a situation to have it that way. I compel my foremen to keep their ditches clean. Our officers require clean station grounds. No brush of any kind whatever is allowed to accumulate about our station grounds. I have my foreman pile his old ties every evening of the day he takes them out. He burns them as soon as they are dry enough to burn. I impress upon him the importance of keeping his splices tight.

A. D. **Adams**—Ditching is very essential to all kinds of ballast. The width of the ditch is not so important as the (In order to get a solid road-bed, you must ditch. Cut ditch about 2 feet below the ties. We don't always hav time or money to ditch as we should. There is no argı about ditches. We all know their necessity. We dig (from the rail, give it a short bevel on the outside; about ! is as near as our slope runs. So far as section foremen ar cerned, they are a good deal like roadmasters.

The Chair—They need watching.

Mr. Adams—Yes. In many cases some of the old foı know more than the roadmaster. We know that. But we want him to know we know it. We give him an order aı pect him to carry it out. I want him to carry out my in tions, whether I am right or wrong.

Mr. Wright—Santa Fe—I approve the recommendati the report of the committee.

Mr. Dickson—I would say the first point necessary to h a good track is to have good ditches. Without them, you keep your joints up or your ties. It is very essential fo foreman to use a leveler. I started in as track foreman, ı think I know the importance of using the leveler in surfac track.

The Chair—In regard to this old tie business for ft call the attention of the gentlemen to the fact that the rep on standard track, and not fuel; and I wish you would ı member that. The question of fuel is not involved in th port.

Mr. Swinney—I agree with several gentlemen who spoken, in regard to instructions to foremen. It is the mo portant question, outside of ditching, that we have unde cussion. I spend as much time with my men as possibl think a blue print or an ordinary print should be furnish every foreman, that he may understand what is required. with my road we have adopted a standard of 16 feet 8½ i width of road bed, 8 foot ties, the edge of the ditch (from the rail. Slope one in one on the inside, and 1½ in o the back of the ditch, and go at least 3 feet below the b of the ties. That is what we make a standard. We m deeper ditch than that if we can. Of course we don't get even 3 feet all the time; but we do the very best we can, and come as near it as possible. This makes our roadway uniform. We clean our right of way in the month of July.

Mr. Adamson—O. & M.—I think the right of way should be cleaned in the month of August. Brush of all descriptions is easier killed out during that month. We make a specialty of suspending all other work in the month of August, and attending to cleaning the track. I would recommend the use of spot boards, and also instruction to foremen.

Geo. E. Cain, being called for, said: I don't know that I can say anything more than has been said. I would like to hear from Mr. Sloan, of the C. & E. I.

James Sloan—C. & E. I.—Mr. President, we aim to put our ditches 2 feet from the rail, with 2-inch slope to the foot. Commencing at the rail, we run back to the outer edge of the ditch straight 12 feet.

We commence to clean our right of way about the last of July or first of August, from fence to fence—100 feet. We pick up our ties about once a month, and burn them and give them away to the farmers or section men who will take them away. That is about all I have to say.

Mr. McGiggins—This is my first time of meeting with you, and it is with considerable reluctance that I attempt to say anything on the subject of a perfect road-bed. There has been a good deal said. Some have had a hobby, and hang on to it. I came here for information, to learn something about the proper means to be used in maintaining a track. What I would like to find out is, how to get a perfect road-bed where a road has been improperly constructed, with two or three men on a section. We have a standard road-bed—on paper. I might tell you my ideas of a road-bed, and they would not differ very much from a majority of the gentlemen. As to the best means of maintaining a track, that depends on the locality. In a rocky country I prefer rock ballast. Over here, where we have no rock and no money, soil is very good. I might attempt to outline what I believe to be a standard road-bed, but I wont, because it makes me feel bad to do *that*. *I can't* work to it. But in regard to instructions to foremen, I find, frequently, it is ve necessary for somebody to instruct the roadmaster. I find good many of them attempting to instruct the foreman wl don't know what they are trying to do. Men say they ins upon discipline, upon their orders being carried out to the le ter. This is proper. But I will venture the suggestion, th among the gentlemen here there are some who, if their orde were all implicitly obeyed, would be looking for a job tw thirds of the time. Now where do the superintendents co from? We are all subject to their orders. The majority of the come from the telegraph offices. They will give you detail instructions how you must do the work. You say "Yes," a go on and do it in your own way. I will venture a majority the men here do this very thing. You tell the superintenden "Yes, that is right. I will do it that way"—but you don' Proper surface and alignment are very desirable. We have not g them all over, but are pretty well fixed. We keep the right of w clean. We cut our weeds in the winter, when the men can't anything else. Now, as to burning up old ties. I used to be wi the Pennsylvania folks years ago. We used to do that. We coul afford to do it. We had a good track—had lots of business- earned lots of money—had lots of men to do our work—a kept right up with it. I will venture to state that not 10 p cent of the men in this room are up with their work, and th can better afford to let their old ties lie until a wet day and th pick them up. We can pile ties on a wet day when we can' shovel black dirt under the ties. I think we can economize o labor in this way. Our rules are to pile them every night. W get a little behind—are scolded a little—and promise to do be ter in the future. There is nothing better than to have a nic tidy road-bed. Yet it is not always practicable.

I think all railroad men will say that drainage is the mo important thing connected with the maintenance of railro track; and the ditches should be as nearly uniform as possibl but I find very few roads where everything is uniform.

CHAIRMAN BURNETT—One of the questions in this report are railroads getting the best possible results for the money pended on roadways?

Mr. McGiggins—No sir, I think not, just for that impracticable interference with the roadmasters heretofore spoken of, where orders must be obeyed implicitly. People who grow up in telegraph offices have their ideas of what is right and proper. I am speaking generally now. I think they do not get the best results. Now in regard to instructions to foremen. I agree with a number of the gentlemen who have talked on this subject. I think it is better to see the foreman personally. If he don't happen to understand the first time, go back and see him again. If he shows a proper disposition to carry out your instructions, talk to him kindly and encourage him. Some men will do a pretty good job in their own way, who will forget your instructions to a certain extent, and therefore I think it an excellent thing to have printed instructions. The greatest trouble I find is in getting the proper material to make foremen of. We pay men $1.10 a day, and they pay $4. a week for board, and the consequence is, a man who can get a job anywhere else wont go to work on the track. I think when you get a young man who is ambitious to become a track man, he should be encouraged. The proper way is to raise your own men.

Mr. Lindsley coincided with the views expressed by Mr. McGeggin.

Mr. Caffrey—Having read the report of the committee and listened to the remarks of the gentlemen, is there anything left for me to say. The question as to whether railroads are getting the best results from the amount expended, is important. As far as I can see, companies are getting the very best results for amounts expended on track. I don't refer to the material they buy, or anything of that kind. I think there is no department of a railroad where the money paid is so well earned as in the maintenance of way. I think, as a general thing, they are the hardest worked, most faithful, and least remunerated of any employes in the service of railroad companies.

The track department, as a general thing, is least considered of all, and as I look at it, it is the most necessary part of the railroad. So far as the amount expended for labor is concerned, I think they do emphatically get the best results for the amount expended.

J. W. Craig, being called for, said: We have never h before this association a more important question than the o under discussion.

First.—What should be a roadmaster's aim?

Second.—Are all roads getting the best results for the mon expended in track repairs.

Third.—In what way can my track be improved with little no additional cost?

Recognizing the most important feature, the committee once took up the subject of drainage. And they say: "T roadmaster's aim should be to have good drainage." My expe ence of twenty odd years has been limited to clay and sa The first thing necessary to a perfect road-bed is good draina You may have the best rail, the best ballast rock, cinders or gr el, but without drainage you never can have a perfect or g road-bed. It is impossible.

Our standard for road-bed is 25 feet, 12½ feet from the cen of the track on either side. In all excavations, outside edge slope in clear 40 inches below the top of the rail. In sand it is 3 f below the top of the rail. We find it more difficult to maintain t slope in sand than in clay. Our excavations vary in dep they run from 4 feet to 20. The sand excavations are lighte We have a standard in our system for everything. The secti foreman, roadmaster or supervisor has his blue print and general rules. They are his guide. We consider what we wa discuss it thoroughly, and as soon as we reach a conclusion, make it our standard. Our section foreman has a blue pr showing what the cross section of the road-bed is in clay exca tions and sand excavations, and showing what the cross secti of the fill is; also showing the position of his guard rail, his f and everything that is possible to give him on the blue pri He has a book of general rules that govern him and the ro master of the road as well. He is required to have a copy these with him every day he is on duty.

Men can not carry out oral instructions with such certai as they can written instructions. They are apt to forget. friend speaks of working well 3 or 4 men on a section. have never had any such experience as that. I have wor

6 men on a single track, 35 ton engines, and maximum speed of 35 to 40 miles per hour, on clay and sandy soil. We put in that track 17 ties to every 30-foot rail, which is less than 3,000 to the mile. We require them to be evenly spaced. Our specifications for ties are 9 feet long 6x10. We use pine ties entirely. We find the average life of a tie to be six years. We put in one-sixth new ties every year, and also the same with bridges. That is the annual depreciation of the perishable material.

Now the education of section foremen is a very important thing, there is no question about this. All good foremen are employed. You can't find them traveling about the country. When you pick up a man of that sort he has done something wrong or is incompetent. A foreman educated to maintaining a track with rock ballast does not know much about sand ballast, and *vice-versa*. I am free to say I don't know the first principles about putting up a track with rock or gravel ballast. I have been educated to use sand and clay, and I have worked up to that. Foremen should be raised on your own road. In that way you get the best results.

We have in our system a gang of apprentices, who are educated in all the duties pertaining to the office of foreman. They are examined every month to enable us to see how they are progressing, and as soon as one is found competent to take charge of a section he is put on a section with another foreman. He does not take entire charge. They work together until that section foreman recognizes him as competent to take charge of the section. In that way we supply all vacancies. Our ties are piled the same day they are taken out.

MR. BURNETT—I have 40 divisions and have employed 4 new foremen in five years. Apprentices would grow old in apprenticeship.

MR. LINDSLEY—We get very good results from tiling in bad places.

C. E. JONES—I have found that by tiling I could drain certain places that I could not possibly drain in any other way, and my track would stay in place and not heave. I put my tiles from 3 to 3½ feet below the surface. I think that tile is cheaper than open drainage in the end.

O. F. Jordan said: I agree with the majority of the members in regard to the best method of maintaining track. But there is one point that I have not heard mentioned that I think should be considered. That is, can we arrange our ties so that they will not have to be moved when laying new rails?

For the past three years when laying new rails I have been moving all the ties to a uniform distance, laying the 30 feet rails, 28 feet rails, and 26 feet rails separate, and have been very particular about getting the right expansions.

By doing this, my idea is that when new rails are laid it will not be necessary to move any ties. We are all aware that there is a slight difference in the lengths of the rails from the different rolling-mills; but so slight that I don't think it would be necessary to cut rails very often to keep joints on the ties.

This could be avoided and it would not be necessary to cut any rails, if the rolling-mill men would be more particular about getting rails all of an even length.

I have talked with different men who are manufacturing frogs and switches and they claim that sawing the rails off cold hardens the ends. One Chicago firm prefers to cut its own rails at a cost of 8 cents per cut, rather than to have them sent in short lengths, cut off cold by rail saw. If rails were cut off cold, all mills could get them the same length.

If we can so arrange our ties that it will not be necessary to move them when laying new rails, it will be a great saving to our railroad companies. Keep our ties in their proper places and we give them equal bearing, and it gives us a better track. I would like to hear the opinion of other members on this matter at our next meeting.

MR. PRESTON—The committee that got up this report is entitled to a great deal of credit. The subject has been pretty thoroughly discussed, and I move that the report be adopted and recommended by the convention. Carried unanimously.

On motion of Mr. Dickson, all persons now members of the association may remain such so long as they shall pay their dues.

President Burnett read several communications to the effect that transportation would be cheerfully furnished roadmasters and ladies, but complaining that the courtesy had been taken advantage of by other associations to pass those not entitled to the privilege. He recommended that every roadmaster take special pains to see that no person receive transportation to and from our conventions, not properly entitled to it.

SECRETARY'S REPORT.

Secretary read his second annual financial statement, as hereafter appears.

On motion of Mr. Dickson the report was adopted and ordered printed in the official report of the meeting.

On motion the salary of the secretary was fixed at $50 per year, and an order was drawn upon the treasurer for that amount to pay the secretary for services for the year past.

Secretary's Statement of the Financial Condition of the Roadmaster's' Association of America from October 20, 1885, *to October* 20, 1886.

1885.			
Oct. 20,	To cash in hand of Treasurer	$175 00	
" "	" " " " " Clerk	88	
1886.			
Apr.	" 22 Membership Dues @ $1.00	22 00	
May	" 36½ " " @ $1.00	36 50	
Oct.	" 54 " " @ $1.00	54 00	
Apr.	" 2 " Fees @ $2.50	5 00	
Sept.	" 35 " " @ $2.50	87 50	
Oct.	" 37 " " @ $2.50	92 50	
	Total amount of cash on hand and received for year		$473 38
1886.			
Jan.	To I. Burnett by draft to pay E. B. Grover, Stenographer	$120 00	
Oct. 14,	" I. Burnett, Stationery, Stamps, Printing, etc	69 92	
" "	" John Sloan, Stationery, Stamps, Printing, etc	30 95	
" "	" Thomas Adamson, Stamps	1 00	
" "	" Benjamin Weaver, Stenographer, on account	50 00	
" 16,	" John Sloan, Clerk, 1886	50 00	
	Total Expenditures		$321 87
	Balance on hand		$151 51

1886.		
Oct. 6,	To Amount in hands of Treasurer	$ 42 45
" 18,	" Amount in hands of Secretary	109 06
" 20,	" Total cash on hand	$151 51

JOHN SLOAN, *Sec'y.*

ELECTION OF OFFICERS.

The next business in order was the election of officers.

President Burnett, by virtue of the limitation in the by-laws being ineligible to a re-election, Mr. Dickson nominated J. W. Craig, of Charleston, S. C., for president for the ensuing year.

Seconded.

On motion of Mr. Caffrey, nominations for president were declared closed, and the secretary was instructed to cast the vote of the association for Mr. Craig.

J. W. Craig assumed the chair as president, and was congratulated by Mr. Burnett, the retiring president, and other members of the association.

President Craig said:

Gentlemen and Members of the Roadmaster's Association of America: **I first met with you in Indianapolis, Ind., in 1884. Though an entire stranger to you all at that time, you thought proper to elect me your second vice-president. The next meeting was in Chicago, in October, 1885. I had looked forward with much pleasure to the time when I would be able to meet with you there. At the eleventh hour circumstances beyond my control prevented my attendance. The association then thought proper to elect me their first vice-president. I have, from the beginning until now done everything in my power to advance the interests of this association. Not being able to attend at Chicago, I made up my mind if I were in the land of the living I would meet with you at St. Louis. And now, having come here, and to be elected your president, fills me with emotions that I can find no language adequate to express. It is an honor I had not expected, and I assure you I appreciate it.**

The association has now a membership of 223.

The first meeting of the association was convened at St. Paul, Minn., September, 1883, with 80 members present. The

second annual meeting was convened at Indianapolis, Ind., September, 1884, where the membership was increased by 62, making a total of 142 for 1884. The third annual meeting was convened at Chicago, Ill., October, 1885, where 81 names were added to our roll, making the membership 223 for 1885. New members, 1886, 64. Total, 287.

This is an age of combination and co-operation; railway companies themselves and the several classes of employes are combining, and coming together in conventions for mutual profit, strength and information. We are the last to seize the advantages thus afforded. The operating department has for years reaped these profits. Public conventions have kept our worthy technical and theoretical friends, the civil engineers; our ever careful and cautious friends, the car builders; our practical friends, the master mechanics, all in the foreground, until it seems to have been forgotten that there is a department which is the very foundation and inception of the whole system, the careful and efficient management of which sustains and insures the safety of all employes, the profit of their employers, and the comfort of the public.

The roadway department of the most insignificant railway surpasses, in actual practical importance, all departments of its own or any other road; and in so much as it does, our position exceeds in responsibility and consequent importance that of any in the line of railway service. What is the result as demonstrated on the black board of time? Surely, that the road service *has kept even pace, at least, in the march of all improvements.*

Having thus briefly adverted to the relations of our department to that of other departments of railroad work, it naturally occurs to consider the purposes of this association.

They are readily seen to be as broad as the importance of our duties, and if, as said before, the profit of the employer and the comfort of the public rest fundamentally upon the integrity of our labor, it follows, as a necessary consequence, that the object of our coming together is practical, comprehensive and thoroughly useful.

A purpose of mutual benefit can only be fully served, if it comprehends the thoughtful consideration of how best to p form the duties of our station, and also how to work for our i mediate betterment and advantage. For the latter can only based on merit, and can come alone upon the best, the most cc scientious, the most thorough work.

The first purpose, then, of this association, is to effect a maintain thorough concert of action and interchange of ide a generous and spirited rivalry of thonght, and to effect a hi and practical standard for our department. This means inte gent and attentive consideration of the several problems p sented from time to time for our solution and the adoption all improvements in ways and means to resist the encroachm of time and decay; quick and generous recognition of every that experience and intelligence of others shall have demonstra to be desirable; and careful and prudent use of means as well men; also to garner, for mutual benefit, the fruits of our ann experience; in a word, with every intelligence on the alert, str ing to make a *perfect road-bed* which, by its economy and streng shall satisfy the company; by its smoothness and safety, co mand the confidence and admiration of the public; and by t manner in which it is managed, leaving no sting of reproach the thoughts and memories of those whose brawn and mus gave it form and symmetry.

C. E. Jones, C. B. & Q., Beardstown, Ill., was unanimou elected first vice-president.

J. H. Preston, Des Moines, Iowa, C. R. I. & P., was una mously elected second vice-president.

Mr. Jones thanked the convention for the honor conferr and pledged himself to do all in his power to advance the intere of the association.

D. H. Lovell, Penn. R. R., Renovo, Penn., was elected se retary.

Thomas Adamson, O. & M., Lawrenceburg, Ind., was r elected treasurer.

S. L. Swinney, W. St. L. & P., Cuba, Ill., was elected member of the executive committee to fill vacancy.

PLACE OF MEETING.

The next business in order being the selection of a place to hold the next meeting, Denver, Col., Cleveland, Ohio, Washington, D. C., Chicago, Ill., Louisville, Ky., Cincinnati, Ohio, Detroit, Mich., Atlanta, Ga., Topeka, Kas., Ottumwa, Iowa, and Buffalo, N. Y., were named, and after several ballots, Cleveland, Ohio, was selected by a rising vote as the place for holding the next convention. By a vote the time fixed for holding the next convention was the second Tuesday of October, 1887, at 10 o'clock, A. M.

MISCELLANEOUS.

MR. DICKSON—I move a vote of thanks be extended to our retiring president, Mr. Burnett, for his untiring energy and devotion to the interests of our association, and his impartial rulings during the proceedings of our conventions.

Unanimously carried.

MR. BURNETT—*Gentlemen:* I thank you for the kindly feelings you have manifested toward me during the time I have acted as your president, and which you have given expression to by your vote. When the association was organized five of us got together, and for two or three hours sat around the hotel, thinking whether we would try to organize or not. By request of several roadmasters, I wrote a great many letters, and tried to reorganize the old association that collapsed in Cincinnati. I received fifty-three replies to those letters, stating that they would be at the hotel in Chicago on the day appointed. Five, including myself, were all that were there. We went up in the hall and sat down on a sofa and organized the "Roadmasters' Association of America," and called a meeting, to be held sixty days later. At that meeting we had quite an attendance, I think about thirty-five. Then and there the association was placed on a permanent footing, and I was elected its president. Most of, you know what the result has been since that meeting. If my services have been of any benefit to the association I am glad of it; and if I can be of any service to you in the future I will render such services just as cheerfully as I have worked with you in the *past.*

A vote of thanks was extended to the secretary, tre
the business men of St. Louis, the St. Louis Bridge Co
the Local Press and the Lindell Hotel proprietors.

It was voted that the retiring president, Mr. Burnett,
retiring secretary, John Sloan, take charge of the pub
of the records and proceedings of the meeting, and au
two copies to be sent to each member of the association.

On motion of ex-President Burnett the president was
ized to make hotel arrangements for the next meeting.

Thereupon the convention adjourned to meet in Cle
Ohio, on the second Tuesday in October, at 10 o'clock
1887.

CONSTITUTION AND BY LAWS.

ARTICLE I.

SECTION 1. The name of the organization shall be the Roadmasters' Association of America.

ARTICLE II.

SECTION 1. The officers of this Association shall be a President, First Vice-President, Second Vice-President, Secretary, Treasurer and the Executive Committee, consisting of five members, including the President and Secretary *ex officio*. The President shall be Chairman of the Executive Committee.

SEC. 2. The officers shall be elected by ballot, and a majority of all the votes cast is required to elect. No officer to be elected for more than three consecutive terms, of one year each, except members of the Executive Committee. They shall be elected one for one year, one for two years, and one for three years. At regular annual meetings hereafter one member shall be elected for three years.

SEC. 3. The President, or, in his absence, one of the Vice-Presidents, in order of election, shall preside at all meetings. In case of absence of both President and Vice-Presidents, the members may elect a President *pro tem.*

SEC. 4. The Secretary shall keep the records of the Association and Executive Committee, conduct all correspondence, issue notices of all meetings of the Association and Executive Committee, and shall collect all fees and dues, pay them over to the Treasurer, and take his receipt therefor.

SEC. 5. The Treasurer *shall* keep the accounts and be

ged with all the funds of the Association, and disburse th
er the direction of the Executive Committee. He shall
annual meetings, or at any other time, if required by t
ecutive Committee, furnish a statement of the funds, inco
d expenditures of the Association.

Sec. 6. All bills against the Association must be approve
y the Chairman of the Executive Committee before they sha
e paid.

Sec. 7. The Executive Committee shall have the genera
management of the Association. Three members of this committee shall constitute a quorum at any regular or called meeting of the committee.

Sec. 8. Vacancies may be filled *pro tem.* by the President.

ARTICLE III.

Section 1. Regular annual meetings of the Association shal
be held on the second Wednesdey in September. Special meetings of the Association or the Executive Committee may be calle
by the President, if, in his judgment, it is for the interests c
the Association to do so. Ten members of the Association sha
be a quorum at any regular or called meeting of the Associ
tion.

Sec. 2. The place of holding the annual meeting shall
designated by a majority of the members present at the regu
meeting.

Sec. 3. The order of business shall be as follows:

1. Opening ceremonies.
2. Reading the minutes of the last regular and any interv
ing meetings.
3. Enrollment of new members.
4. Reading communications.
5. Reports of committees.
6. Unfinished business.
7. Miscellaneous business.
8. Discussion of proper questions relating to duties of
bers, and appointing committees.
9. Election of officers for the ensuing year.
10. Choosing place of next regular meeting.

ARTICLE IV.

ION 1. No person shall become a member of this Asso-
who is not a man of good moral character, and who is
oadmaster in good standing. If such, he may become a
by paying a membership fee of two dollars and fifty
nd subscribing to the Constitution and By-laws.

2. The Executive Committee shall have power to levy
ents upon members for the necessary expenses of the As-
n.

3. Any member may be expelled from this Association
wo-thirds vote of the members present at any regular
.

ARTICLE V.

ION 1. This Constitution shall be subject to revision at
ular meeting of the Association by a vote of at least two-
f all the members present.

A REMINISCENCE.

The members of the Roadmasters' Association were tre with genuine hospitality during their brief sojourn in St. L and were shown every honor and distinction by the solid busi men, capitalists and best citizens of the place.

The most striking example of the many courtesies rec occurred at the last day's session, when, after adjournme the hotel, the members of the Association were met in the corridors by a delegation of business men (with carriages in ing), who requested that members of the Association and ladies should accompany them on a carriage ride about the The request was complied with, and the forty or more carri with their occupants were first driven to the Fair Grounds. a bountiful and sumptuous lunch had been prepared at the house, which included every delicacy of the season. Mr. Ell of the Frog & Switch Company, and several others, respo to toasts; and in every respect the occasion was one that will be remembered by all present. The party then embarke their carriages and were given a delightful drive through city, taking in the different and beautiful parks; after whic members of the Association and their ladies were driven to hotel, and the most of them took their departure for home same evening. As a convention of roadmasters, and hol our meetings in an unostentatious manner, "off years" t into consideration, our reception and treatment by the citi of St. Louis is certainly a matter of which we ought to be pr and the hearty welcome accorded us should receive a respon echo from the hearts of each and all.

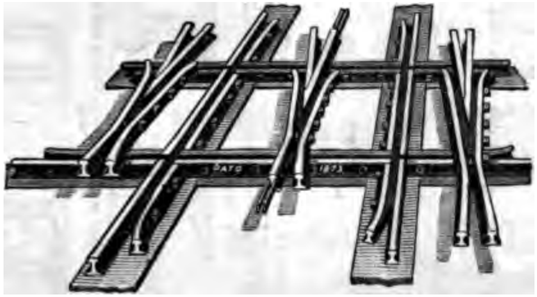
ELLIOT FROG AND SWITCH CO.

—MANUFACTURERS OF—

Railroad Frogs and Crossings,

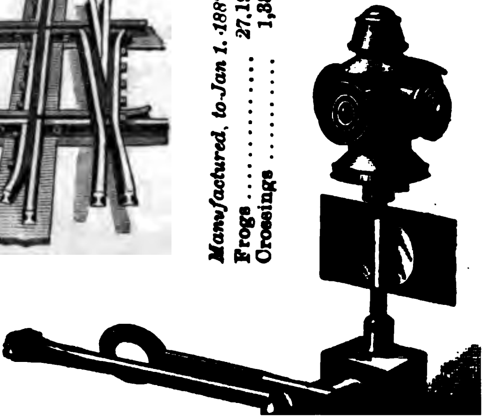
Any Weight or Section of Rail Desired—or any Angle.

☞ Our Stiff Rail Frogs and Crossings are made with SOLID WROUGHT - IRON FRAMES.



Manufactured, to Jan 1. 1887.

Frogs	27,197
Crossings	1,387



Spring Rail Frogs, Switch Stands and Switches

OF VARIOUS KINDS, TO WIT:

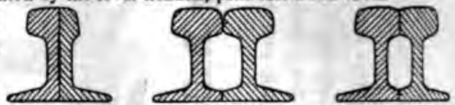
Split, Lapp and Stub, with Rods, Slide Plates and Head Chairs; Rail Braces, Wrecking Frogs, and General Railroad Iron Work. Our large capacity

THE WEIR FROG CO.

manufacture a full line of goods for Track purposes, among which are six styles of Rigid Frogs, two styles of Spring Frogs, also Die Formed Split Switches, Crossings, etc., etc. as partially illustrated herewith. There having been some discussion as to the merits of the different methods of constructing points of frogs, we have concluded to show them all up, believing there wil be but one conclusion by the level-headed, practical track-men.

Cut Cross Section, No 1, shows original method of making points of frogs by notching the main point rail to receive short point rail.

Cut No. 2, shows the first improvement on this by which the head of the main point rail was preserved but the base weakened. Cut No. 3 shows the full strength of the main point rail preserved, but a the cost of very materially weakening the short point rail, so that it has a very slim vertical support. Cut No. 4 shows the last improvement, which is the Weir system, manufactured and controlled exclusively by us. This is what we term our Die Formed Short Point. By this method we not only save the full strength of the main point rail, but more of the original strength of the short point rail and produce a stronger construction of the point rails generally.



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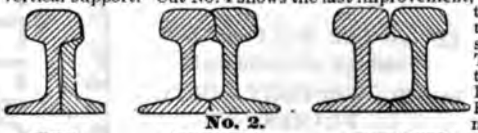

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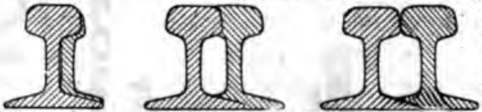

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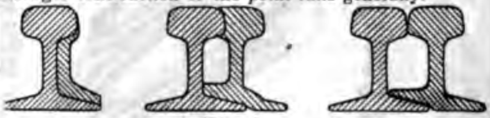
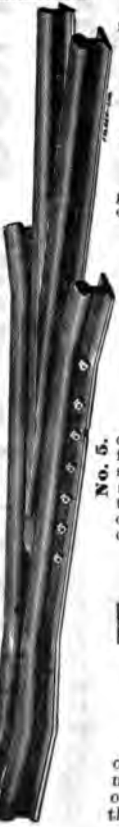


No. 4.

These cross section cuts are fair illustrations photographed down from full sized drawings, therefore they can be unhesitatingly accepted as correct.



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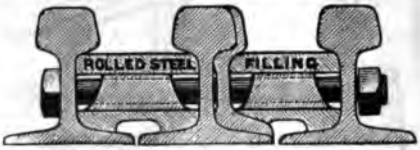
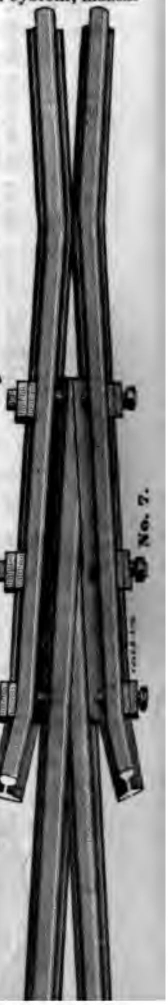


No. 6.

Cuts Nos. 5 and 6 show plan and cross section of our celebrated Rolled Steel Filled Frog. We claim superiority for this, because of the steel filling and the manner of constructing the filling, by reason of which the vertical strain is entirely taken off of the bolts and is transmitted past them and on to the base of the rails. Several thousand of them are in use and have received the strongest kind of endorsements.



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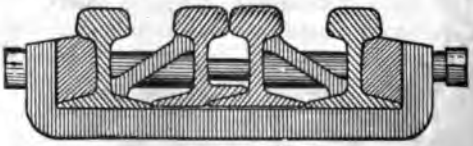
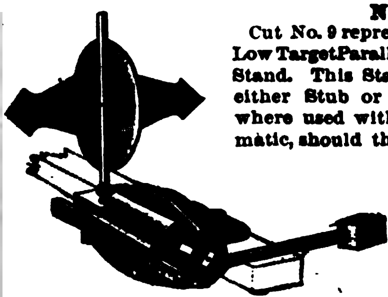


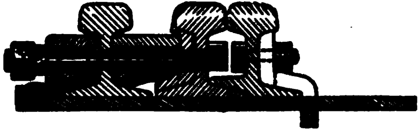
No. 8.

Cuts Nos. 7 and 8 represent plan and cross section of our Arched or Truss Frog, which is our latest impro ment in rigid frogs. The arch or truss plates are m of cast steel and the clamps of wrought iron. We be this frog will prove itself second to none.

No. 9

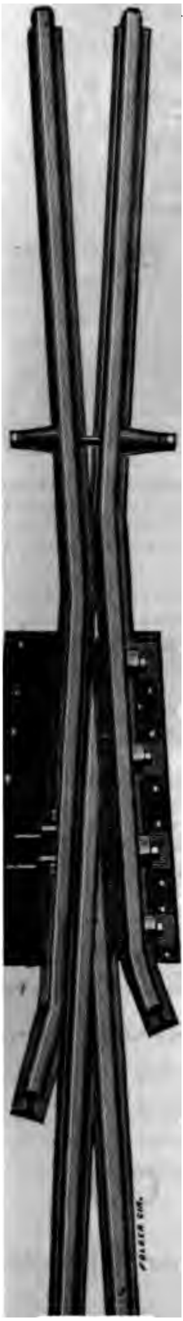


Cut No. 9 represents our Automatic Low TargetParallel Movement Switch Stand. This Stand is appicable for either Stub or Split Switches, and where used with the latter is automatic, should they trail through it. It is very solidly constructed and is highly appreciated by all who use them.



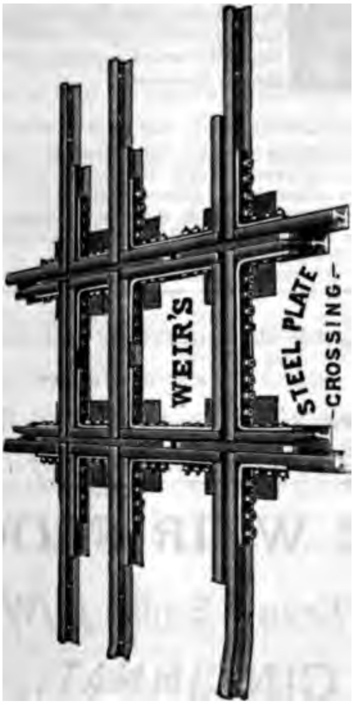
No. 11.

Cuts Nos. 10 and 11 show plan and cross section of Spring Frogs, which are on half inch steel plates. the same being secured to the frog by wrought iron angles or clips on the bolts passing through the webs of the rails and thereby saving injury to the wing and point rails by riveting through these flanges. The holding down strap is in U form, also secured to the web of the rail. The springs are made of square steel with long range of motion. This combined arrangement produces a very excellent frog, giving good satisfaction.

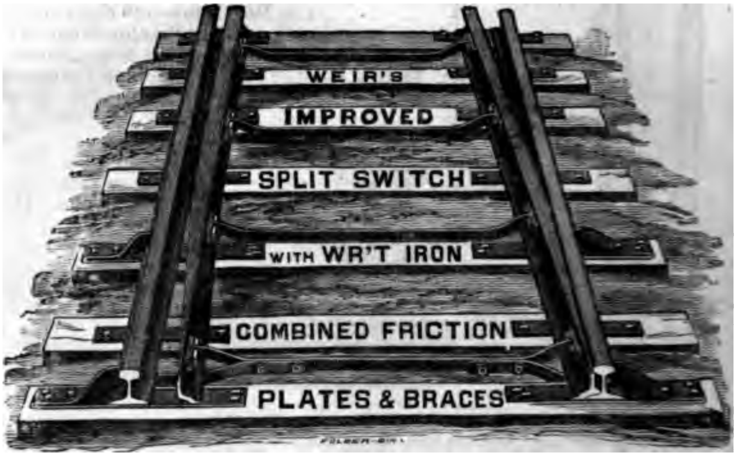


No. 10

No. 12.



Our Rolled Steel Filled Crossings, as shown by Cut No. 12, are very extensively used. These Crossings are secured with specially rolled very heavy wro't iron bars, which with the use of 80 or more through bolts, ⅞-in. diam. Hex nuts, the widest Verona nut-lock, and the addition of the Van Dusen nut-lock on the outside of the nuts as a double security, produce the strongest and most durable structure possible; and being supported on steel plates at each corner, the durability of not only the crossing, but also the ties are assured, without impairing the elasticity.



Our Die Formed Split Switches, as shown by this cut, possess many valuable and superior features. The die forming permits of the use of friction plates of wrought iron of a uniform thickness. Our Combined Wrought Iron Brace and Friction Plate used with them, have no equal, as they are indestructible, and we alone have the right to furnish them. We furnish with these switches well forged braces; the ends are very heavy, all set edgewise for strength and all sunk to the level of the ties. These switches have a superior reputation and large numbers are in use.

These cuts illustrate our Wrought Iron or Steel Plate Head Chair that are so much superior to the old cast iron, that further argument in their favor is unnecessary.

Is the Wrought Iron Rail Brace made by this Company and gotten up to supersede the old style of cast iron ones that are usually clumsy, yet are easily broken in spiking and from other causes. These are indestructible either in spiking or any other way, and as they only weigh 7 pounds, where the old style weighed from 15 to 25 pounds, they are fast doing what they are designed for, running the cast iron out. Several of the leading lines are now ordering them by the thousands.

To illustrate and describe all our manufactures, would be too much of an undertaking for this publication, but we shall be pleased to furnish estimates, photographs and blue prints on application. Address

THE WEIR FROG CO.,

WORKS: Front, Smith & Water Streets,

CINCINNATI, O.

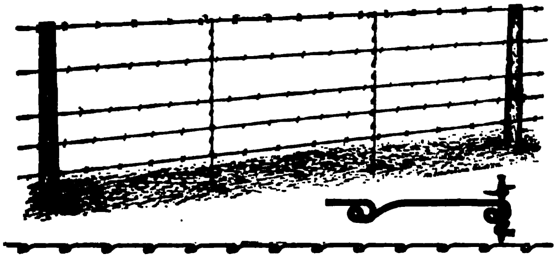
THE FENCE POST QUESTION SOLVED

BY THE USE OF

Adam's Patent Fence Stay.

PATENTED:

April 10, 1883.
Oct. 23, 1883.
Sept. 15, 1885.
Nov. 4, 1885.
July 6, 1886.
July 20, 1886.
Nov. 11, 1886.
And other applications now pending.



IT IS THE ONLY PRACTICAL FENCE STAY IN THE MARKET.

It is very cheap, and by its use a first-class fence can be built with the use of one-third the usual number of posts. Posts may be set from two to four rods apart.

If your fences have begun to sag, it takes the place of an intermediate post, and costs no more than the post hole. It thoroughly locks the fence wires together and prevents their sagging. It prevents pulling the wires apart; they cannot be spread when locked by this stay. It weaves the fence together.

They are made of **No. 9 Galvanized Steel Wire,** and are stiff, strong and indestructible. The loops are so adjusted as to fit any wire fence. It is simple, easily applied, and any one can put it on.

President BURNETT says of them:

CHICAGO, ROCK ISLAND & PACIFIC RAILWAY,
OFFICE OF DIVISION ROADMASTER,
JOLIET, ILLS., Nov. 27th, 1886.

W. J. ADAM:

Dear Sir: Having given your Fence Stay a thorough trial, I take pleasure in recommending it as a device of *great merit.*

Yours truly, I. BURNETT,
Div. Road Master.

The C., R. I. & P. R'y had been doubling its posts, and, after trying this stay, adopted it in place of extra posts.

It has received the endorsement of all Railway Engineers who have examined it.

MANUFACTURED ONLY BY

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APPLIANCES,

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☞ Catalogues, Plans and Estimates furnished upon application,
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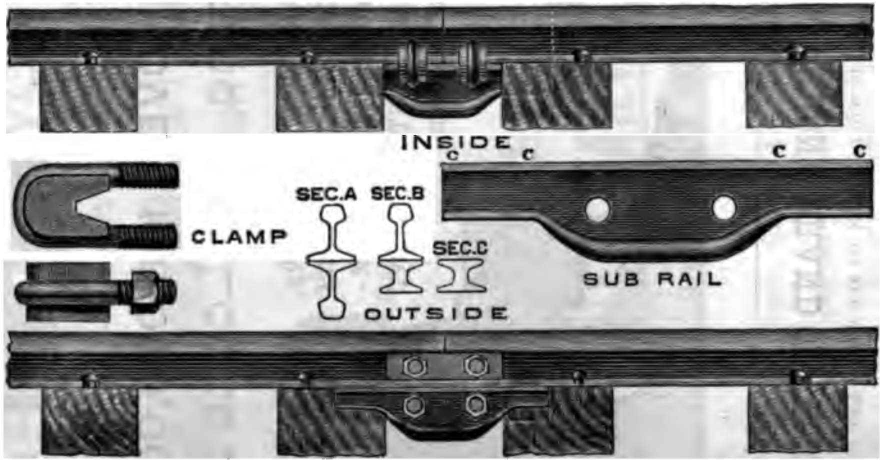
THE MORGAN RAIL JOINT.



THIS JOINT,

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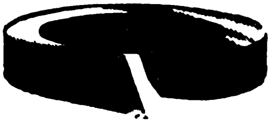OVER 100,000,000

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This has been proved, by long EXPERIENCE and actual track service, to be the SIMPLEST and MOST EFFICIENT means of securing

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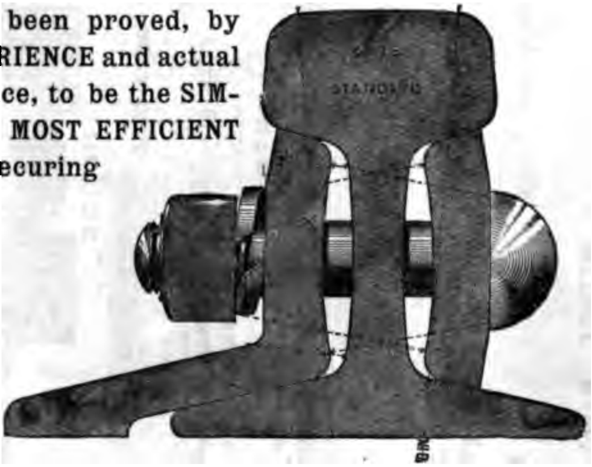

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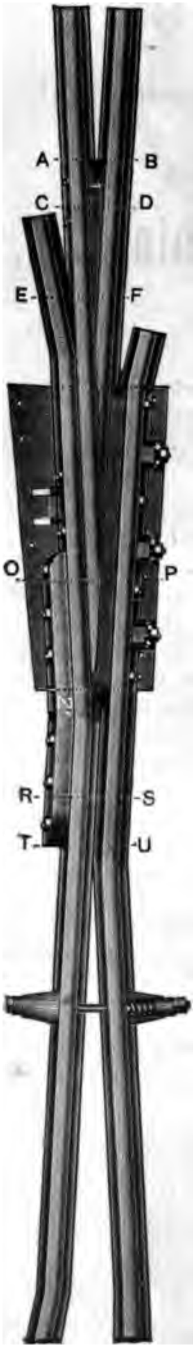


IMPROVED RAILWAY FROGS.

PERRY'S

Heel and Wing Rail Easing Blocks,

—FOR—

GUTTERED WHEEL TREAD.

APPLICABLE

To all Patterns of Fixed and

SPRING RAIL FROGS.

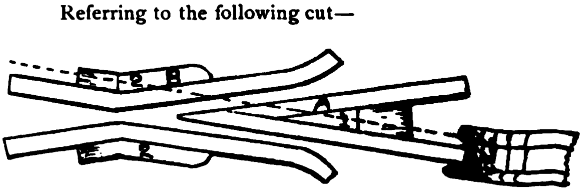
They are the application of a mechanical **principle** that completely eliminates the destructive element in guttered wheels with "T" rail frogs, and should not be disregarded in any rail frog construction.

They add more than 50 per cent to the **durability** of the frog, and save a similar per cent in its cost of maintenance.

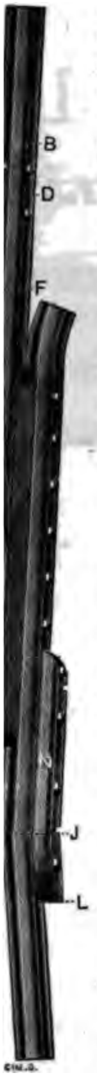
They give a degree of comfort and safety to the carriage of traffic and equipment equal to the unbroken rail.

In support of these claims please read carefully the following argument:

Referring to the following cut—



the dotted line shows the points "A" and "B" where the outer flange of a guttered wheel tread comes in contact with the frog members. Thus: When running from heel toward the frog point, the guttered flange—falling below the general face of the frog—strikes the point rail at "A" with great force, and with an effect that strongly tends to sheer the wheel from its course into a line with the opposite point rail. This sheering crowds the regular flange of the wheel over to the wing rail, where—if the point rail, the



wing rail or wheel, is not broken by the sheering process—the outer or guttered flange of the wheel is finally forced to mount and cross over the point rail, with the depreciating effect of a severe lateral shock to whatever the wheel carries, and with dangerous cross strains that are often the cause of wheels breaking and always of a rapid depreciation of the point rails.

In a similar manner when the wheel runs in the direction from point to heel, this outer flange of the guttered tread comes in contact with the wing rail at the point "B" where the same conditions exist to sheer the wheel from its normal course to the direction of the wing rail. This force acts with great energy to draw the regular wheel flange hard against the frog point, and again—if the devices to resist these abritary strains are not broken—the guttered flange is finally forced to mount and cross over the wing rail, with all the bad effects stated of its crossing the point rail.

These defects in "T" rail frogs with guttered wheel tread have been a constant source of care and expense.

My plan is to wholly eliminate them, and is accomplished by widening the frog rail face at the points of impact, "A" "B" equal to the wheel tread. This is done by steel blocks neatly fitted and firmly bolted to the frog members. They are shown in the cut by the figures 1, 2 and 2. The approaches to the blocks are inclined by about one-half inch vertically—and below the frog face—to a run of about eight inches horizontally. This inclination forms an easing by which the outer flange of a guttered wheel is gradually carried up to the frog's face and smoothly across it.

This principle in construction has been put to thorough test in practice, and everywhere with gratifying results.

There is not any disintegration or cutting out in acute angles where the point rails meet nor on the wing rail crossing. Wheels guttered to any extent are not in the least swerved from their normal course and the carriage is free from any lateral shock.

The easing blocks are of simple construction, inexpensive and readily applied to any pattern of the fixed or spring rail frogs.

r present a feature of permanent way that is important in economy of d perfection of track, to a degree that cannot be claimed for any ture of railway work involving so small an expenditure.

Please address

T. H. PERRY,

601 East Jefferson Street,

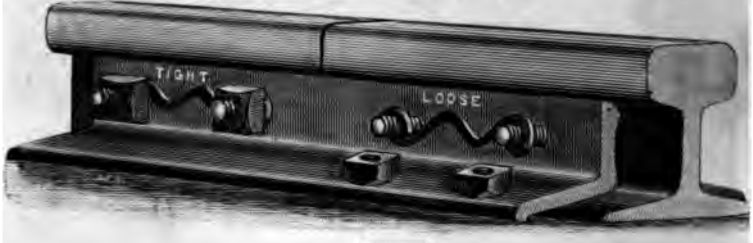
Bloomington, Il

THE EXCELSIOR

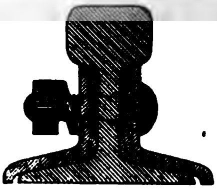
Automatic Nut-Lock

AND

FISH PLATE SPRING.



Patented January 16, 1883,



We Challenge the Worl to Produce its Equal.

Place the spring as shown in cut, with the eyes bearing outward against nuts, and screw them up the usual way, by which the spring is compressed the centre becomes the fulcrum, pressing inwardly against the fish plate, two ends of the spring becoming levers pressing outward against the nuts; spring now becomes a permanent automatic lever, pressing heavily between nuts and fish plate.

By this invention the loosening of the nuts and plates is prevented, and joint is as solid as any part of the rail. They are cheap, durable and effect only one spring required for two bolts. They cannot rotate with the nuts, are not so easily lost or mislaid. They make a permanent, fast joint, and the labor of track-men screwing up nuts.

We Claim for our Excelsior Automatic Nut-Lock and Fish Plate Spring

1. **The "S" or serpentine form gives the lengthened surface of the spring.**
2. **The elliptic and twist of the spring give the resistency.**
3. **The pressure of the spring clamps the fish plate tight to the rail, and prevents loo ness and rattling.**
4. **The friction of the elliptic and twist spring prevents the nuts from rotating.**
5. **This spring, being hardened and oil-tempered, can be used as often as required.**

In placing the spring on the bolts the centre of spring shonld bear on fish plate, and screw them up in the usual way.

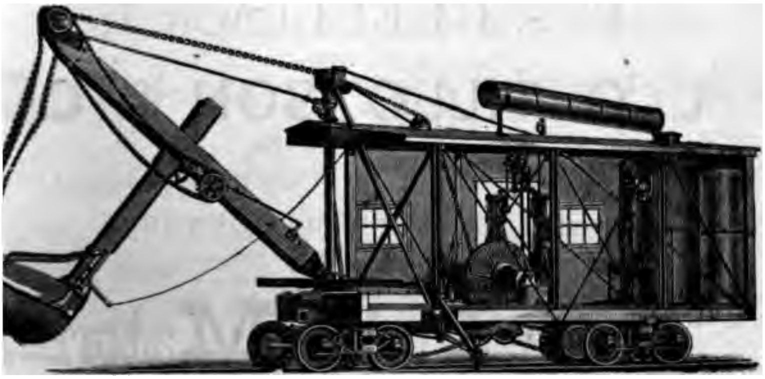
Sample lots furnished for trial, *free of expense*, by forwarding the dista between centres of the fish plate bolts.

Correspondence and orders solicited.

RUFFNER, DUNN & CO.

Patentees and Sole Manufacturers,

ylkill Falls, - - *Philadelphia, Pa*

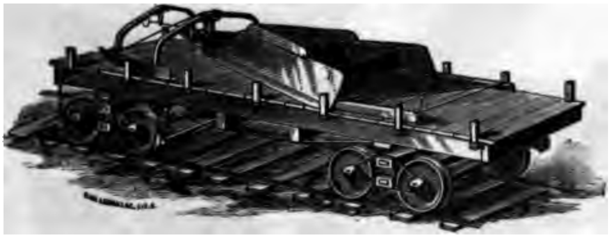


The above cut represents one of our

Rail Road Steam Shovels and Wrecking Cars.

The machine is built first-class in every respect, and entirely of Channel and eye beams, and braced in every manner of way by wrought iron rods braces. It is built on two pairs of Standard Master Car Builders' Trucks, will run on any standard gauge road. This machine has a 1½ yd. bucket, h is built entirely of steel and makes about three dips per minute. This hine will load on an average 20 to 30 cars an hour, and from 8 to 9 yards car. It is also a first-class Rail Road Wrecker, and is used as such on several rent roads. For further information write

THE MARION STEAM SHOVEL CO., Marion, Ohio.



The above cut represents one of our

Ballast Unloaders,

h operate on cars without the use of the center-guide, by simply putting es in the stake-pockets of the car. These machines are used on quite a num- of the principal roads in the U. S., and they are giving entire satisfac- n. We sell the above Ballast Unloader and Steam Shovel with a guarantee t if they do not give entire satisfaction they can be returned at our expense. r any further information please write

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VERONA STEEL WORKS, manufacturers of SOLID Cast Steel Tools and Nut Locks.

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DEALERS *in RAILS and FASTENINGS, SPIKES, ADZES, AXE all Miscellaneous Supplies and* SIGNAL APPLIANCES,

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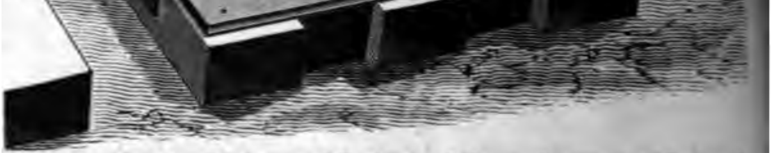

Prevents the Settling of Rails at Joints; Secures a Smooth Track; Reduces the Percentage of Danger from Accidents; Reduces the Noise of Trains; Prevents Spreading of Rails. Applicable to any Rail Joint in use. For particulars, address

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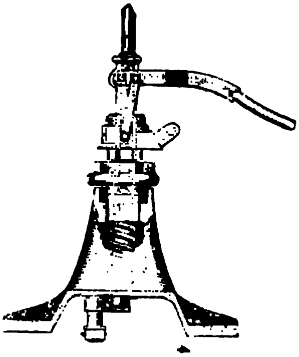
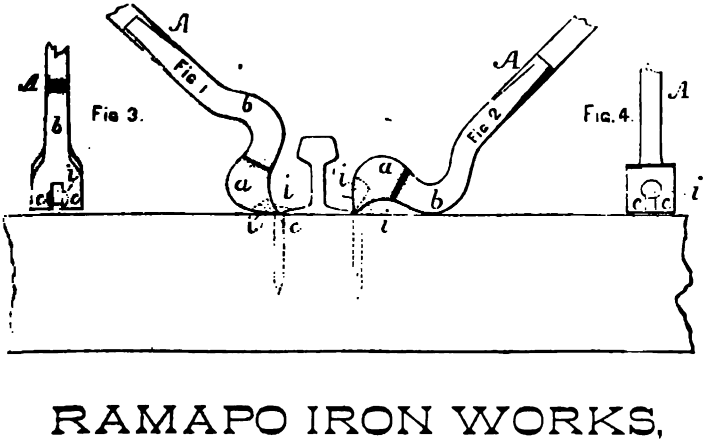
AUTOMATIC SAFETY SWITCH STANDS.



HAMM'S SPIKE PULLER.



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PROCEEDINGS

OF THE

FIFTH ANNUAL CONVENTION

OF THE

Roadmasters' Association

OF

AMERICA,

HELD AT THE

Kennard House, Cleveland, Ohio,

OCTOBER 11, 12 and 13, 1887.

Compliments of

SAVANNAH, GA.:
MORNING NEWS PRINT.
1888.

THE

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SWITCH ÷ AND ÷ FROG ÷ DEPARTMENT,

CLEVELAND, OHIO, U. S.

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Tie Bars, Wrought, Cast and
Malleable Head Chairs,
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Iron Sheds, Wrought and
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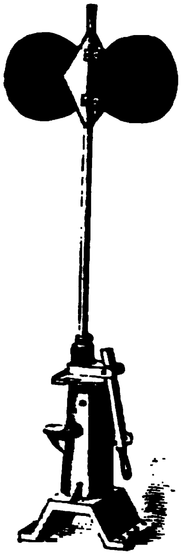

ALL RAIL Cold Worked on Special Milling Machines adapted to make Joints and Contact Surfaces perfect fits.

FROG and CROSSING FILLING of Patented Rolled Steel Section, same quality material as the Rails.

SPLIT SWITCHES have no thin Fin to be broken by Flanges, and have Jointed Tie Rods, detachable for Repairs, etc., by removal of Two-keyed Bolts only.

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PROCEEDINGS

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Proceedings of the Fifth Annual Convention

OF THE

ROADMASTERS' ASSOCIATION OF AMERICA,

HELD AT THE

KENNARD HOUSE, CLEVELAND, OHIO,

OCTOBER 11th, 12th & 13th, 1887.

The Roadmasters' Association of America assembled at 11.30 A. M., October 11, 1887, at the Kennard, House, in Cleveland, Ohio, for their Fifth Annual Meeting, in response to the following call:

ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE PRESIDENT,
CHARLESTON, S. C., June 15, 1887.

In accordance with the action of the meeting of roadmasters, held in St. Louis, October 12, 13 and 14, 1886, the Fifth Annual Meeting of the Association will be convened at the Kennard House, Cleveland, O., for three days' session, at 10 o'clock A. M., Tuesday, Wednesday and Thursday, October 11, 12 and 13, 1887.

The committee appointed to prepare a programme of questions for discussion at this meeting have submitted the following:

1st. Unfinished Business.
2d. Standard Guard Rails for Frogs.
3d. Standard Frogs.
4th. Standard Guard Rails for Bridges and Re-railing Safety Frogs at Bridges.
5th. Standard Track Joints.
6th. Standard Rail.
7th. Standard Hand Cars.

DEAR SIR—You are respectfully invited to be present at this, the Fifth Annual Meeting of the Association. Arrangements are now under progress whereby we hope to arrange with railway managements to pass all delegates (and their wives) who hold a certificate issued by the Association, showing him to be a delegate to this convention. All who can meet with us will please notify the secret of their intention to do so, and he will furnish delegates with c tificates, should the several railway managements consent to ho them in lieu of a pass. Should we be denied this mode of trans tation, you will be promptly notified, that each one may make ot arrangements for passes. Those who are not members and wish join the Association, and cannot spare the time to attend this m ing, may do so by filling the enclosed petition and forwarding same to the secretary. Arrangements have been made for spe rates at the Kennard House, in Cleveland, thus insuring all attend a pleasant stay in the city. All roadmasters and track pervisors are invited.

J. W. CRAIG,
President,
Charleston, S. C.

H. W. REED,
Secretary pro tem.
Waycross, G

The President, Mr. J. W. Craig, of the C. & S. R. R., ca the convention to order, as follows:

Mr. Craig—*Gentlemen of the Roadmasters' Association of Am ca:* Your convention adjourned at St. Louis, to meet in Cle land on the 11th of October, 1887, at 10.30 A. M., and that h having arrived you are now in session for business. It affo me a great deal of pleasure to see so many of you to-day; doubt the number will be largely increased this evening; a it also affords me a great deal of pleasure to introduce to yo this morning a gentleman who will favor us with an address It is only necessary for me to mention his name, without sayin anything more, he is so well known to you. It is Mr. Charle Latimer, of Cleveland, Ohio. (Loud applause.)

Gentlemen of the Roadmasters' Association of America: It give me the greatest satisfaction to look into the faces of so man friends, whom I know so well, and to greet such a representa tion of the roadmasters of America.

There are at the present time in our land about 150,000 mile of railroad, and upon these roads there must be not less tha 1,500 to 2,000 roadmasters.

We all know what a serious thing it is for you to be absen from your duties at any time, and it is a high compliment t you that the managers so feel the importance of this conve tion as to give you leave of absence.

It is a grand thing to see this *whole* force organized in on body and meeting once a year for mutual improvement, interchange of thought and mutual support. It would be very suggestive, too, to note the proficiency acquired by those who interest themselves in these conventions and discussions, and the loss which they who stay away suffer.

You represent for the most part men who, from sheer force of adaptability or fitness, education and strength of character, have been raised to the position of guardians of the track of our great railway system; men who did not crawl in through the cabin windows, but came through the hawse-hole, *i. e.*, not by favor but by work; selected for the position because it was necessary for the safety of the traveling public that the most capable should be appointed. Whatever favoritism may do to advance others, the only touchstone for the position of roadmaster must be *fitness*, so that he stands independent; he can say: "I am roadmaster because I was faithful and worthy of my place," and as only railroad men can understand the serious responsibility of the position. As one of you, with responsibilities resting on me, I fully sympathize with you in all your aims for improvement and true advancement, exhibited by this gathering, and do most heartily welcome you to the Forest City of America.

The discussion of all questions concerning track, inventions, best methods, materials, is essential; and last, but most important of all, our attention must be directed to the handling of human forces, to the labor question, the vital issue of our day. What do the knowledge and intelligence of the roadmaster avail unless he understands the art of governing and the knowledge to select his men. And when I use the term governing, I do so with a sigh of regret that man requires to be governed at all, for the greater the intelligence of labor the less it requires to be governed. More time is lost and more money squandered on account of the lack of what is called "governing power" than from any other cause. How shall we describe this governing power? It is not in the sharp, dictatorial tone in which many issue their commands; it is not in the pompous, consequential manner by which some endeavor to impress their authority upon their fellows when in power.

You will, I feel sure, agree with me that the highest order of

governing power is derived from the fact that its possesso
imbued with the importance of his work, and taking a profo
interest in it, can communicate all his earnestness, all his
to those who, under Providence, occupy subordinate positi
to him. There must be the true sympathy of co-workers
tween the chief and those who aid him—in fact, your gover
(he only who governs by divine right) must be one who has
only a brain to devise and direct, but a heart to appreciate
efforts of those to whom he confides the practical details of
administration. The law of love is the true law, the only fo
dation of true government; love of our fellow men, love of
work, and, above all, love of our Creator, to whom we m
look for guidance in the difficult crises to which we are
quently liable.

You are all men controlling large numbers of workers, wh
positions, in many cases, are absolutely dependent upon y
word. A scratch of a pen often sends a poor man to a weep
wife and children, who look for support to the daily work
the husband and father on the track under your charge.
sometimes happens that you receive an order against wh
your common sense revolts. In your judgment it involves
safety of the people traveling on your road. With a hea
heart you go to your office to discharge some of your oldest
most faithful men. How you need a prayer to guide you
selecting those whom you must drop from your list. I h
been obliged sometimes to give such orders. It is well for u
we retain our manhood, our humanity, our sympathies, and
not become cold, heartless, unfeeling, mere railroad machi
Brother railroad men, keep your hearts soft! Railroad
chines are expected only to do what they are told and to l
to superior beings to do their thinking for them.

This reminds me of my first experience as a midshipm
when a boy of 14, on a man-of-war. I had not been long
board, on my first cruise, when I was ordered to perform s
duty. Failing to report that it had been attended to, I
called up by the lieutenant and asked why I had not report
"I thought," I began to say. "You thought?" he thunder
"you had no right to think." A few days afterward I
[illegible] to attend to another duty. I reported when it was do

The lieutenant asked me why I did not bring an answer immediately. I replied, "I did not think." "Did not think?" he exclaimed; "what was your mind given you for?" I pondered on these different methods of teaching, and was not long in deciding that I would do my own thinking. The value of my own deductions I would like to impress on you all, for it is nothing more than the great idea underlying our Constitution —independence of thought.

Those of you who have read the printed proceedings of the roadmasters' meetings on the Atlantic and Great Western, or the N. Y. P. & O., will notice the gradual changes in the methods of thought of our roadmasters. In our first meeting I found that some of our members were diffident about expressing their opinions, and in response to questions would say, "I agree with Mr. Latimer." I made a point right there, and said: "I do not wish any roadmaster to quote me for his opinion, however flattering it may be to have this deference to my judgment. I beg you to give me your unbiased, independent thought; then, when I hear your opinion, I shall know that I have something valuable, the earnest reasoning of a strong, intelligent man." How thankfully I now look back to the effect of those few words. I had the support, my friends, of twelve wise roadmasters, each thinking for himself, giving his heart and soul to his work. They were a power and support to me in my duties, and a blessing to the road. I can review with inexpressible satisfaction this experience of years of association with the roadmasters of the old Atlantic and Great Western. I delight to think of our meetings, and honor these men as the best types of disinterested sons of toil in one of the most arduous, most honorable and most responsible positions in the world. Our methods of government were tried during more than ten years under the general management of one of the wisest railroad men of the country, whose loss we lament—Mr. Devereux. They had for their base the theory that the best government is that under which men are least governed. Each man, from highest to lowest, as it is the fashion to express it, had his due meed of honor, praise and credit. Under its admirable working there was perfect harmony in the whole force. Knowing himself, respected and honored in the faithful discharge of duty, each man was true to his trust—the section foreman, the section man, always vigilant, through the dreary nights of wintry sleet and snow, or flood and fire, his light flashing out in the face of engineer and trainman to calm and strengthen them while the locomotive dashed blindly over the road in darkness "that might be felt," sixty miles and more an hour, the precious freight of humanity depending upon one poor (but how rich) knight of pick and shovel, when one single mistake from him might send many souls to eternity—and the result! We may all be pardoned for a thrill of exultation, tempered, we hope, by gratitude to a Divine Power, when we know that in these ten years of organized toil over six hundred miles of road not one passenger, not a single employe, was killed from fault of track or trackmen. (Applause.) Many of these earnest workers have gone unrewarded in this life, looked upon with little more consideration than mere machinery, but sure of finding the greeting, "Well done, good and faithful servant," when their pilgrimage is over.

We need but make one illustration of responsibility of the track force by referring to a late accident upon one of the railroads of a more western State, where, by the neglect of a section force, five hundred men, women and children were killed or wounded in a moment.

People generally do not appreciate the work of the trackman, particularly that of the winter months. They do not concern themselves about the difficulties under which the roadmaster, the foreman or watchman labors in the present method of running trains at a speed only limited by the power of the machine, especially on the dark nights. We who are here know how much they deserve our honor. There are heroes among them worthy to rank with those who have gained military honors in the defence of their country.

I have said that these men were faithful. Let me point to your branch of the railroad service in those days of agitation, such as have not shaken the earth in the memory of modern times, as consisting of men pre-eminently faithful. We all remember 1877, the year of the railroad earthquake, as we may call it. While the whole transportation departments of several great systems threw down their tools and struck, the trackmen remained steadfast, and no manner of intimidation nor persuasion could move them from their allegiance to their duty. They said: "The track is the foundation of the whole structure, and if that goes what will become of the structure?" A remarkable situation was presented subsequently, with circumstances almost the same as those of 1877. Your forces have remained true and firm to their trust, doubtless amid many grievances. Your counsel must have been good, your influence strong and your loyalty tried to the uttermost. Your conservatism is most praiseworthy, most thankworthy, as we look upon the millions spent to override the laws of our country. Yet God forbid that I should denounce any man or set of men for a legitimate struggle to obtain rights wrested or withheld from the laborer by combined money or any other power, and here comes in the necessity for independent thought. We *must* think for ourselves. We must think fearlessly. No honorable man in the nation will deny to you the right to think and act independently upon all questions which concern the present and future welfare of yourself and your family, and every railroad manager is blessed and benefited who encourages his force to think as well as to obey. I am in entire sympathy with all labor or- anizations which have for their aims mutual improvement, utual support, free discussion of all questions that concern eir work and welfare. It is only the unwise or, perchance, il in position who does not avail himself of the intelligent ought of his subordinates and who says, "Do as you are told, d mind your own business," should the thoughtful man offer uggestion. You are *forced* to think upon the labor question ether you will or no. It is a live question; it is a great blic question, and the railroad labor question is essentially most alive of all. Had it not been for the railroad we uld not have had the labor problem to meet at this time. we must stand in our lot with them in these last days and all the wisdom with which the Lord has endowed us, and do our part to solve this question so intimately connected our daily and indeed our eternal life. To work out these ems is the duty of every citizen, and no one should permit lf to be a drone. You are railroad roadmasters, yet you e American citizens, with all of the privileges of the richest or poorest in the land. Some men in our country would forbid you to think except in the line of your track. These men are the enemies of freedom, and are in the category of those who would thunder at you, "You have no right to think, sir!"

Railroad man as I am, if I should say, "I think that the United States Government, *or*, rather the people should own their own railroad and telegraph systems, men of this order would thunder out, "You have no right to think, sir!" When I once before uttered this thought one of our so-called best railroad newspapers declared that it was strange that a good engineer should be so ignorant of political economy, and added, furthermore, that I was a revolutionist! But such utterances from the organ of rings, which are a curse to us and to our country, and especially a curse of the poor, need give us no unhappiness. We must think, and, perchance, we may find that the purchase of all the railroads and avenues of public intelligence by the people is the true cure for strikes and for the corruption of legislature and Congress. There would be no lobbying, no buying men's votes to grant to a few individuals a body of land that would make the poor of our States rich. We must own our highways and telegraphs. Do not fear corruption in the handling of them; there would be infinitely less than at present. If the safety of the republic should be endangered by the corruption which might ensue from the purchase of the roads, and our country's existence hang upon so slim a thread, then it is not worth saving. But be assured that our constitution has a broad foundation and cannot be overturned either by the rings on the one side, or by fanatics who substitute brute force on the other, though between them, if they could, they would overturn the whole fabric of liberty.

However, whether the public highways belong to one power or to another, we must not fail in our loyalty to recognize lawful authority. Our means of reform lie in our own hands—the ballot; the ballot, which is our weapon for the cure of our ills and dangers to-day. It is all-powerful, while the unlawful attacks upon the power of individuals owning property by virtue of the laws which we make ourselves serve only to retard the cause of liberty of thought and action.

When I had the honor of addressing you some years ago I ouched upon the subject of one great demoralizing influence in ailroad work, viz.: the wholesale desecration of the Sabbath in his country by railroad companies. I feel that no opportunity hould be lost of reiterating the great importance of obtaining the complete day of rest to which you are entitled. How this great wrong is to be rectified has been a subject occupying my attention for years, and I have put forth every effort in my power to check the evil in the work over which I have had charge.

I was lately in Toronto, that lovely city of our neighboring country, on a Sunday. Not a railroad train, not a street car was running, not a restaurant was open, and as to a saloon, the most degraded would blush to see the day so desecrated. Glorious country! Invincible in keeping the law of God. But here we of the United States are pushed to the wall by a power upon which we cannot lay our hands. A fateful influence keeps our railroad men bound down as were the children of Israel under Egyptian bondage, and the employes are powerless to help themselves. Indeed, I am not sure but that Sunday pay warps their souls. It is gratifying to note that the Knights of Labor in one of our cities have taken the matter in hand.

Now we have a noble set of men as managers of our railroads in this country, and we may say the same of employes generally, from highest to lowest. But I must believe, from personal observation, that your hope of escape from this enthrallment depends not upon managers, but upon yourselves. You have the right to your rest. It is a covenant between God and his people. Assert your right by petition, and there will not be a right-minded manager of a railroad in the country who will not hail it with satisfaction, and grant it without loss of time, and go with you. The rest day ought not, however, to be granted you as a privilege; it is yours by right; it must not be taken from you. Exercise your right and petition that all Sunday work shall be abolished, and God will bless the petition and bless you and your families. How many are excluded from the comfort of being with their families on any Sabbath day. This is especially true with transportation men. Many train men have not spent Sunday at home for months.

My friends, I may never have the opportunity of addres you again, but I beg that you will carry this important thou to your homes and to your work. Consider that you are t tees not only for your stockholders but for your God, manag His railroads; that His covenant with your forefathers was Sabbath, and as you hope to be blessed in your managem you must remember the Sabbath day to keep it holy.

Trusting that your discussions and actions may be harm ous, valuable, creditable alike to yourselves and honorable the roads you represent, I wish you happiness here and fruition for your work hereafter. (Applause.)

The President—On behalf of the Roadmasters' Associatio America, allow me to return to you our sincere thanks for y very kind and able address. We appreciate it the more, c ing as it does from one whose experience in railroad life been for many years not in theory alone, but in practice. have been associated with these men—you know their e history, their capabilities and their duties through life, these remarks could not come from one to be more thoroug appreciated than from Mr. Charles Latimer. [Applause.]

Mr. Latimer—Thank you, Mr. President.

The acting Secretary, Mr. H. W. Reed, S., F. & W., cal the roll, as follows—the † indicates those who answered to t names:

List of Members up to and Including the Convention of 1886

† Adams, A. B.	W., St. L. & P.	LaFayette, Ind.
Adams, Thomas	B. & O.	Connelsville, Penn.
Atherton, L. E.	C., B. & Q.	Moulton, Iowa.
† Burnett, I.	Supt. Joliet Steel Co.	Joliet, Ill.
Burnett, C. M.	Central Iowa	Marshalltown, Iow
Bailey, Isaac	W., St. L. & P.	Cowles, Neb.
Brown, Geo. M.	Flint & Pere Marq.	East Saginaw, Mic
Breckenridge, W. L.	C., B. & Q.	Bairdstown, Ill.
Bowen, B.	Wisconsin Central	Stevens Point, Wis
Bowen, J. H.	M. P. R'y	Glenwood, Minn.
Brunk, J.	Wisconsin Central	Oskosh, Wis.
Brennan, J.	St. P., M. & M.	St. Paul, Minn.
Brennan, J. J.	St. P., M. & M.	Minneapolis, Minn
Buhrer, C.	C., Santa Fe & Cal.	Streator, Ill.
Butler, John	I. C.	Pontiac, Ill.

Brown, S. H.	C. & N. W. R'y	Sparta, Wis.
†**Buel, H. A.**	C., M. & St. P. R'y	Redwing, Minn.
Bartlett, Daniel	K. C., St. J. & C. B.	St. Joseph, Mo.
†**Bolan, James**	D. B. C. & A. R. R.	East Towas, Mich.
Bolan, Mat.	Central Iowa R'y	Ackley, Iowa.
Burgdorf, C. W.	Union Pacific	Denver, Col.
Baxter, R. W.	S. P. Coast R. R.	Alameda, Cal.
Brown, W. F.	W. & L. E R'y	East Toledo, Ohio.
Blemer, J. R.	T. C. & St. L. R'y	Marion, Ind.
Bennett, George	C., M. & St. P. R'y	Horicon, Wis.
Brown, E.	Union Pacific	Rawlins, Wyoming.
Beauprie, W. R.	C. & W. I.	Auburn Junction, Ill.
Boardman, E. A.	Union Pacific	Golden, Col.
Burke, P. D.	Central Pacific	Minot, Dak.
Baker, R.	I. B. & W.	Mount Carwell, Ill.
Boom, John P.	L. N. A. & C.	Frankfort, Ind.
Brandt, Wm.	C. & N. W. R. R.	Madison, Wis.
Byrne, Hugh	L. N. A & C. R. R.	Lafayette, Ind.
Battin, H. W.	C. & N. W. R. R.	Tracy, Minn.
Burns, M. F.	U. P. R. R.	Boulder, Colo.
Briggs, J. W.	N. P. R. R.	Helena, Mont.
†**Barrett, P. W.**	L. & H. R. R. R.	Warwick, N. Y.
Bates, W. G.	D. S. & S. F. R. R.	Pueblo, Colo.
Barry, John	Bishopville	Atkins, S. C.
Carle, J. D.	B. C. R. & N. Ry.	Watertown, Dak.
Cronin, Thomas	Mo. Pac. Ry.	Palestine, Texas.
Conners, J. S.,	Canadian Pac.	Winnipeg, Manitoba.
Capwell, W. E.	A. T. & S. F. Ry.	Nickerson, Kan.
†**Cain, Geo. E.**	W. St. L. & P. Ry.	Decatur, Ill,
†**Courtney, W. H.**	L. S. & M. S.	Erie, Penn.
Crippen, J. A.	C. M. & St. P. Ry.	Sioux City, Iowa.
†**Cox, A.**	C. St. P. M. & O.	LeSueur, Minn.
†**Collom, J.**	N. P.	Jamestown, Dak.
Cox, J. E.	C. M. & St. P.	Sanborn, Iowa.
Cornell, C. H.	C. M. & St. P.	Dubuque, Iowa.
Carnes, E. H.	C. St. P. M. & O.	Worthington, Iowa.
†**Craig, J. W.**	C. & S.	Charleston, S. C.
Cummings John	C. P.	North Bay, Ont.
Collopy, J. H.	N. Y. C. & St. L.	Bellevue, Ohio.
†**Campbell, G. R.**	O. C.	Bucyrus, Ohio.
Cox, Frank	C. R. I. & P.	Atlantic, Iowa.
†**Caffrey, Richard**	Lehigh Val. Ry.	Whitehaven, Penn.
Carnahan, W. J.	T. & P. R. R.	Weatherford, Tex.
Carney, C.	Ill. Central	LeMars, Iowa.
Coughlin, W. J.	C. M. & St. P. Ry.	Mason City, Iowa.

Crowley, Wm.	A. & P. R. R.	Williams, Ariz.
Davis, Garrett	B. C. R. & N.	Riverside, Iowa.
†Doyle, John	D. L. & N.	Ionia, Mich.
Doom, John P.	C. & W. I.	Chicago, Ill.
Downing, G. W.	N. P. R. R.	Little Falls, Minn.
† Diddle, A. J.	I. D. & S.	Indianapolis, Ind.
Dwyer, Thomas	M. L. S. & W.	Manitowoc, Wis.
Dunn, Wm.	B. & O. R'y	Newark, Ohio.
Donovan, J.	Canada Pacific	Winnipeg, Manitoba.
† Dickson, Thomas	C. & P.	Wellsville, Ohio.
Drury, E. G.	C., M. & St. P. R. R.	Marion, Iowa.
† Diddle, W. G.	D. O. & O. R. R. R.	Olney, Ill.
Donahoe, W. J.	C., R. I. & P.	Iowa City, Iowa.
† Dodson, John A.	B. & D. R. R.	Greenesboro, N. C.
Dickson, J. A.	B. N. & C. R. R. R.	Rochester, N. Y.
Daley, P. W.	L. E. & W. R. R.	Lima, Ohio.
Davey, E. C.	Wabash R. R.	Brunswick, Mo.
Devine, M. W.	A. C. Line	Wilmington, N. C.
† Erwin, Wm.	K. & P. R'y.	Kingston, Ont.
Evans, J. C.	Illinois Central	
Erbey, W.	C., M. & St. P. R'y	Perry, Iowa.
† Erickson, L.	N. Y., L. E. & W. R'y.	Galion, Ohio.
Edwards, E. P.	C. & N. W. R. R.	Webster City, Iowa.
Foracre, W. W.	Ga. Pac. R'y	Douglasville, Ga.
Forbes, James	A. & N. M. R'y	Lordsburg, New Mex.
† Freeland, A. N.	A. C. Line	Sumter, S. C.
Fitzgerald, Thos.	Shenandoah Val. R'y	Shepardstown, W. Va.
Finn, J. A.	N. P. R. R.	Billings, Montana.
Flynn, Luke	C. & N. W. R. R.	Eagle Grove, Iowa.
Fitzpatrick, T.	S. P. R. R.	Sierra Blanco, Texas.
† Galarneau, F. X.	L. E. & W.	Lima, Ohio.
Gregory, W. H.	C., M. & St. P.	Monticello, Iowa.
Grace, Perry	C., M. & St. P.	Waukesha, Wis.
Griffin, M. J.	N. Y., W. S. & B.	Kingston, N. Y.
Gogarty, Pat	N. P. R. R.	Billings, Montana.
Grogan, John	Southern Pacific R'y	Houston, Texas.
Grey, Joseph	M. H. & O.	Ishpenning. Mich.
Gregg, R. D.	I. I. & I. Ry.	Kankakee, Ill.
Gallagher, M.	W. C. R. R.	Ashland, Wis.
Galvin, J. T.	O. C. R. R.	Grant'sPass, Ore.
Gilhooley, M.	L. & N. R. R.	LaGrange, Ky.
Glenn, Pat.	O. R. & N. R. R.	The Dalles, Ore.
Gilchrist, J. B.	U. P. R. R.	Sterling, Col.
Geone, D. E.	Texas Pac. R. R.	Marshall, Tex.
Gaffney, John	St. L., Fort S. & W.	Eldorado, Kan.

, Thomas	C. R. I. & P. R. R.	Genesea, Ill.
ett, H. E.	Ore. & Cal.	Portland, Ore.
M.	C., B. & Q. R. R.	Red Oak, Iowa.
g, D. W.	C., M. & St. P.	Horicon, Wis.
ton, R. A.	W. St. L. & P.	Defiance, O.
. A.	C., M. & St. P.	Chicago, Ill.
d, Joseph	K. C. St. J. & C.B.	St. Joseph, Mo.
homas	C. M. & St. P.	Wells, Minn.
. B.	C. M. & St. P.	Albert Lee, Minn.
M.	Fargo Southern.	Fargo, Dak.
ey, P.H.	C. M. & St. P.	Perry, Iowa.
mes M.	L. & N.	LaGrange, Ky.
A.	A. T. & S. F.	Emporior, Kan.
er, H. D.	Ohio & Miss.	Aurora, Ind.
F. E.	C. M. & St. P. Ry.	Marion, Iowa.
nd, C. P.	R. & D. R. R.	Atlanta, Ga.
. G.	Central Pac. Ry.	Promontory, Utah.
on, J. C.	Atl. & Pac. Ry.	Daggatt, Cal.
John	N. P. Ry.	Bozeman, Mont.
y, Timothy	M. C. R. R.	Jackson, Mich.
ant, J. D.	Southern Kan.	Lawrence, Kan.
n, G. W.	C. S. & M.	Marion, Ala.
s, A. M.	Norfolk Sou.	Berkley, Va.
on, H. H.	L. S. & M. S. Ry.	Elyria, Ohio.
James	D. & R. G. W. R. R.	Salt Lake, Utah.
, O. F.	M. C. R. R.	St. Thomas, Ont.
. E.	C. B. & Q. R.R.	Beardstown, Ill.
P. H.	C. & N. W. R. R.	Winona, Minn.
n, J.	C. M. & St. P. Ry.	Mitchell, Dak.
, J.	C. M. & St. P. Ry.	Oxford Junc., Iowa.
C. B.	White Water R. R.	Cambridge City, Ind.
n, J. A.	C. & N. W. R. R.	Madison, Wis.
L. L.	Texas Pac. Ry.	Big Springs, Texas.
P. J.	C. I. St. L. & C.	Kankakee, Ill.
J. B.	C. M. & St. P. Ry.	Cologne, Minn.
M. D.	St. P. & D. R. R.	St. Paul, Minn.
E. R.	C. & N. W. R. R.	Chicago, Ill.
Pat.	I. B. & W.	Kenton, Ohio.
D. H.	Penna. R. R.	Renova, Penn.
n, C. A.	C. & N. W. R. R.	Sterling, Ill.
Geo. W.	D. & R. G. Ry.	Durango, Colo.
P. H.	C. & N. W. Ry.	Milwaukee, Wis.
Geo. J.	A. T. & S. F. Ry.	Newton, Kan.
Chas.	B. R. B. & L. Ry.	Winthrop Junc., Mass.
F.	C. R. I. & P. Ry.	Keokuk, Iowa.

Linsley, J. H.	C. B. & Q. Ry.	Galesburg, Ill.
Larr, G. W.	W. St. L. & P.	Essex, Ill.
Lem, L.	Tex. Pac. Ry.	Baird, Tex.
Marshall, James	Chic. & Alt.	Huntingdon, Ind
†Mulkahy, Edward	C. W. & M.	Elkhart, Ind.
Massey, V. M.	N. P. Ry.	Spokane Falls, W
†Mahony, D.	O. M. Ry.	Olney, Ill.
Moran, Thomas	Chic. & Alt.	Kenton, Ohio.
Moll, J. B.	C. M. & St. P. Ry.	Faribault, Minn.
Mitchell, C. F.	C., M. & St. P.	Mazomanie, Wis.
Mott, E. H.	G. B. W. & St. P.	Plover, Wis.
Moore, A.	C., I., St. L. & C.	Greenesburg, Ind.
Moran, J. T.	Illinois Central	Waterloo, Iowa.
Mayer, J. A.	St. P., M. & M.	Delano, Minn.
Merrill, G. W.	L. S. & M. S.	Kalamazoo, Mich.
Marsh, F. M.	S. C. & P.	Missouri Valley, Io
Morris, T. O.	C. J., St. L. & C.	Indianapolis, Ind.
Mills, E. R.	Southern Central	Moravia, N. Y.
Meeds, F. W.	A. & P.	Albuquerque, N. M
Morgan, J. F.	N. P.	Missoula, Montana.
† Melville, Chas.	W., St. L. & P.	Jacksonville, Ill.
Mahony, M.	W. C. & W. M.	Chippewa Falls, Wis
† McInarna, M. J.	N. Y., P. & O.	Mansfield, Ohio.
McNarney, M.	C., M. & St. P. R'y	Elgin, Ill.
McMichael, Geo. C.	W. I. & N.	Marshalltown, Iowa.
McClintock, W. H.	L. & N.	Louisville, Ky.
McDonald, J. H.	C. & N. W.	Escanaba, Mich.
McQuiston, J. C.	C., I., St. L. & C.	Indianapolis, Ind.
McMillan, John	C., M. & St. P. R'y	Minneapolis, Minn.
McBride, James	St. L. & C. S.	Jerseyville, Ill.
McDonough, M.	Texas Pacific	Marshall, Texas.
† McEntaffer, D.	W. & L. E.	Norwalk, Ohio.
McLeod, A. L.	U. P.	Junction City, Kans
Moore, H. C.	N. Y. C. & N.	High Bridge, N. Y.
Molynex, M.	G. C. & San F. R'y	Dallas, Texas.
† Mulvey James	G. C. & S. F.	Alvin, Tex.
Mallard, Chas. C.	Morgans La. & T.	Algiers, La.
† Mullane, R. D.	C. S.	Somerset, Ky.
Madigan, T. J.	T., St. L. & K. C. R'y	Charleston, Ill.
McGurgan, F. H.	Wabash Ry.	Moberly, Mo.
McGiven, J.	N. P. Ry.	Brainard, Minn.
† McEniry, Chas.	B. C. R. & N. Ry.	Sibley, Iowa.
McCormack, P.	M. & C. Ry.	Iuka, Miss.
McAvoy, Anthony	M. & L. R. Ry.	Brinkly, Ark.
McKeown, P. W.	D. L. & W. Ry.	Mt. Morris, N. Y.

Nash, J. L.	M. S. S. M. & C.	Minneapolis, Minn.
†**Nolan**, P.	N. O. & T.	Birmingham, Ala.
Nichols, E. M.	C. R. I. & P.	Joliet, Ill.
Newcomb, G. B.	North Eastern	Florence, S. C.
Nelson, C. L.	O. P. Ry.	Daggett, Cal.
O'Brien, Joseph	Ill. Cent.	Champaign, Ill.
O'Boyle. J.	D. & R. G. Ry	Grand Junc., Colo.
O'Neil, Dennis	S. C. Ry.	Auburn, N. Y.
O'Leary. D.	D. & D. Ry.	Waverly, Iowa.
†**Perry**, J. A.	Vir. Mid. Ry.	Charlottesville, Va.
Philbim, M.	C. R. I. & P.	Joliet, Ill.
Plunkett, P.	M. L. S. & W. Ry.	Clintonville, Wis.
Pierce, H.	C. H. & D. Ry.	Connersville, Ind.
†**Preston**, J. H.	C. R. I. & P.	DesMoines, Iowa.
Pease, W. S.	C. M. & St. P. Ry.	Elgin, Ill.
Potter, W. H.	C. M. & St. P.	Tama City, Iowa.
Pearson, J. H.	E. & C. Ry.	Evansville, Ind.
Phelon, E. W.	C. M. & St. P. Ry.	Millbank, Dak.
Peters, P.	A. T. & S. F. Ry.	Topeka, Kan.
Payne, W. F.	C. St. P. M. & O. Ry.	St. Paul, Minn.
Purcell, M.	J. M. & I. Ry.	Columbus, Ind.
Perry, Thomas H.	L. E. & W. Ry.	Bloomington, Ill.
Phillips, John	Ohio & Miss.	Lebanon. Ill.
Rustine, Bryan	D. L. & N. Ry.	Ionia, Mich.
†**Rafferty**, Thomas	C. M. & St. P. Ry.	Lanesboro, Minn.
Raynor, T. N.	C. & G. T.	Battle Creek, Mich
† **Roach**, P. K.	O. & M.	Pana, Ills.
Ross, Donald	D. G. H. & M.	Pontiac, Mich.
Reton, V. A.	C. M. & St. P.	Monroe, Wis.
Richards, O. D.	L. S. & M. S	Andover, Ohio.
†**Reed**, H. W.	S. F. & W.	Waycross, Ga.
Ryan, James	C. & E. I.	Danville, Ills.
Robbins, W. L.	E. & T. H.	Evansville, Ind.
Rogers, James	L. N. A. & C.	Louisville, Ky.
Robinson, T. V.	C. St. L. & P.	Algona, Iowa.
Reeves, O.	C. & N. W.	Marietta, Wis.
† **Roberts**, John	I. B. & W. Ry.	Columbus, O.
† **Reilly**, Wm.	C. & A. Ry.	Bloomington, Ill.
Rahm, John M.	Penn. & N. Y.	Towanda, Pa.
Ross, John	F & P. M. Ry	Evart, Mich.
Repelye, John	U. P.	Denver, Col.
Ryan, J. C.	U. P.	Denver, Col.
†**Ready**, M.	Vandalia Line	Effingham, Ill.
Reilly, Phillip	P. & N. Y. C.	Tunkhannock, Pa.
Sweeny, D.	Denver & R. G.	Canon City, Col.

Scott, J. W.	C. O. & S. W. Ry.	Cecilia, Ky.
Sullivan, M.	Central Pac. Ry.	Truckee, Cal.
Schofield, James	Northern Pacific	Livingston, Mont.
Sharkey, P.	K. C., St. J. & C. B. Ry	Council Bluffs, Ia.
Shea, John T.	R. W. & C.	Lowville, N. Y.
Smith, Richard	Southern Pac.	Woodville, Tex.
Stackhouse, R. J.	Danbury & Norwalk	Danbury, Conn.
† Stimson, W. B.	G. R. & I. Ry.	Grand Rapids, Mich.
† Shehan, D.	C. I. Ry.	Keithsburg, Ill.
Stern, R.	C., M. & St. P. Ry.	Marion, Iowa.
Sagerdahl, Wm.	C. & G. T.	Valparaiso, Ind.
† Swinney, S. L.	W. St. L. & P.	Cuba, Ill.
Sutherland, A. M.	C. & N. W. R'y	Escanaba, Mich.
Steele, J. R.	W. St. L. & P.	Forrest, Ill.
† Sloan, John	I. B. & W. R'y	Indianapolis, Ind.
† Sloan, James	C. & E. I. R'y	Danville, Ill.
Stockwell, C. H.	C., M. & St. P. R'y	Coon Rapids, Iowa
Stafford, M. A.	Central Iowa	Oskaloosa, Iowa.
Shattuck, C. D.	C., M. & St. P.	Faribault, Minn.
Sullivan, J.	Illinois Central	Dubuque, Iowa.
Sawyer, F. E.	St. L., K. & N. W.	Keokuk, Iowa.
Shaw, G. R.	O. R. & N. Co.	Portland, Oregon.
† Shea, M.	C. N. O. & T. P.	Somerset, Ky.
Salter, J. F.	Miss. & Tenn.	Sardis, Miss.
Steiner, J. L.	P., D. & E. R'y	Grayville, Ill.
Soland, A.	C. B. & Q. R'y	Rock Island, Ill.
Smith, J. C.	C. K. & N.	Herrington, Kan.
† Scott, S. G.	G. R. & I. R'y	Plainwell, Mich.
† Shine, Daniel, Jr.	B., N. Y. & P. R. R.	Olean, N. Y.
† Swart, E. F.	S. C. R. R.	Auburn, N. Y.
Stuart, John	L. S. & M. S.	Coldwater, Mich.
† Summersett, W. B.	Car. Cent.	Maxton, N. C.
Schofield, John	J. H. & I. R'y	Brazil, Ind.
Shearer, L. H.	Lehigh Valley	Buffalo, N. Y.
Shoemaker, J. P.	C., M. & St. P. R. R.	Sioux City, Iowa.
Smith, D.	O. R. & N.	Umatilla Junction, Ore.
Thompson, W. A.	C. & G. T.	Blue Island, Ill.
Tripp, Geo. B.	C., M. & St. P.	Tomah, Wis.
Tierney, John	M. & N. W.	Elma, Iowa.
Tompkins, J.	C. H. & D.	Lima, Ohio.
Thomas, J. L.	G. H. & S. A. R'y	Houston, Texas.
†Tudhope, John	U. P.	Kansas City, Mo.
Trumbull, James	S. C. R. R.	Kingsville, S. C.
Unger, Nicholas	T. & P. M. Ry.	Ludington, Mich
Wilson, D. C.	W. St. L. & P.	Ferguson, Mo.

ster, J. A.	C. & N. W.	Sac City, Iowa.
an, M. P.	Northern Pac.	Glendive, Mont.
erston, John.	D. Bay City & A.	Lapeer, Mich.
t, John W.	C. & N. W.	Madison, Wis.
t, David	M. & P.	Minneapolis, Minn.
ms, G. M.		Minneapolis, Minn.
, I. B.	I. W.	Indianapolis, Ind.
t, George	A. T. & S. F. Ry.	Topeka, Kan.
y, Geo.	Hot Springs	Malvern, Ark.
, N.	Can. Pac.	Three Rivers, Que.
, Thomas	Ohio & Miss. Ry.	Mitchell, Ind.
ner, J. C.	Ft. W. C. & L. Ry.	Fort Wayne, Ind.
ly, A. H.	K. C. St. J. & C. B. Ry.	St. Joseph, Mo.
en, Carson	C. C. & A. Ry.	Chester, S. C.
, R. A.	C. St. P. M. & O.	Omaha, Neb.
, T. J.	Duluth & I. R.	Two Harbors, Minn.
ce, W. J.	E. S. R. R.	Eureka Springs, Ark.
an, J. B.	C. B. & Q.	Creston, Iowa.

following list of new members proposed for election was read—the † indicates those who were present:

R. M. A. OF AMERICA.

f Members Joining the Association Since Convention of 1886 up to and including the Convention of 1887.

ander, Jno. T.	Ga. Pac	Atlanta, Ga.
n, Robt.	St. L. A. & T.	Malden, Mo.
, A. P.	E. T. V. & Ga.	Atlanta, Ga.
son, J. A.	S. Carolina	Summerville, S. C.
geoin, J. H. K.	G. R. & I.	Petoskey, Mich.
, B. F.	O. & M.	Flora, Ill.
e, A. L.	L. S. & M. S.	Hillsdale, Mich.
, Z. W.	Fall Brook Coal Co.	Wellsboro, Penn.
on, S. T.	C. C. & A.	Batesburg, S. C.
ings, Wm.	L. N. O. & T.	New Orleans, La.
, Dennis	O. & M.	North Vernon, Ind.
s, Colin A.	L. & N.	Paris, Tenn.
ens, F. A.	South Fla.	Sanford, Fla.
rcy, John	R. & D.	Charlottesville, Va.
, M. R.	B. N. Y. & P.	Buffalo, N. Y.
on, J. B.	Penn Co. C. & P. R'y	Wellsville, Ohio.
t, V. D.	Mex. Nat.	City of Mexico, Mx.
pie, A. J.	R. & A.	Richmond, Va.
r, N. A.	C. B. & Q.	Villisca, Iowa.

Gross, G. W.	C. & S.	Ridgeland, S. C.
Heister, W. A.	N. Y. L. E. & W.	Buffalo, N. Y.
Howe, P.	B. C. R. & N.	Estherville, Iowa.
Houghton, Geo. B.	L. S. & M. S.	Norwalk, Ohio.
† Hutchison, H.	B. N. Y. & P.	Olean, N. Y.
† Jolly, J. S.	Fla. Sou. Ry.	Rochelle, Fla.
Jackson, J. M.	J. S. E. Line	Havana, Ill.
Kirbey, James	Southern Pacific	Shulenburg, Tex.
Lynch, James	N. P.	Sprague, W. T.
† Mandeville, J. O.	Lehigh Valley	Hazleton, Pa.
† Moore, J. Willis	S., F. & W. Ry.	Thomasville, Ga.
Manning, W. T.	B. & O.	Pittsburg, Pa.
McInerny, M.	Mo. Pac.	Emporia, Kan.
McGovern, J.	Grand Trunk	Brockville, Ont.
Palmer, Martin	F. R. & N. Co.	Waldo, Fla.
† Ramsey, John P.	C. H. & D.	Connersville, Ind.
Rowan, M.	C. N. O. & T. P.	Hattiesburg, Miss.
Robinson, W. D.	C. & N. W.	Carroll, Iowa.
† Shepard, C. F.	B. & M.	Ranenna, Neb.
Smettem, W. T.	St. L., A. & T.	Tyler, Tex.
Smith, J. P.	T., St. L. & T. C.	Delphos, O.
Scanlin, Patrick	C. & N. W.	Belle Plaine, Iowa.
† Thurston, J. C.	C. St. P. M. & O.	Black R. Falls, Wis.
Wyatt, J. B.	B. & M. R.	Atchison, Kan.
Weaver, J. H.	Ga. Pac.	Birmingham, Ala.
Walsh, Wm.	Can. Pac.	Three Rivery, Que.

The President—Should any desire to join the association now is the proper time to do so. If there are none, the list just read is now before the convention for the action necessary to admit them as members to this association; they have complied with the rules by paying the initiation fee, and complied with all the necessary requirements.

On motion of Mr. Cox, seconded by Mr. Galerneaux, they were declared unanimously elected members.

The President—I have received communications from a large number of members not present who will be here between now and 2 o'clock, and desiring to have as many as possible present to participate in the discussions of the various subjects in hand, I should be pleased to have some member move an adjournment until 2 o'clock p. m.

On motion of Mr. Burnett, of the Joliet Steel Works, the convention adjourned until 2 o'clock p. m.

Afternoon Session.

Tuesday Afternoon, October 11th, 1887.

The convention was called to order at 2 o'clock p. m., President Craig in the chair.

The President—There are several invitations extended to the Roadmasters' Association, and Mr. Latimer will explain one of them.

Mr. Latimer—Gentlemen: I met the Mayor of the city, and he expressed to me the desire to meet you all, and would have been here to-day to welcome you to the city of Cleveland, but he was unfortunately called to Columbus, Ohio, and is not in the city to-day. Now, Mr. J. H. Shaler, President of the N. Y., P. & O. R. R., wished me to say to you that it gave him great pleasure to offer a train to the roadmasters to take a trip through the city and visit the various manufactories and points of interest to-morrow, if it is agreeable to you—in the afternoon, from 3 p. m. until evening, if that will be a good time for you. Mr. Smith, General Manager of the Cleveland and Pittsburg, also extends this invitation, and would be extremely happy to furnish trains for that purpose.

The President—You have heard the invitation of Mr. Latimer and others, and I would state that the hours I propose for transacting the business of this association in convention assembled will be from 8.30 to 12.30, and from 2.00 until 5.00. Now, in the acceptance of these invitations it must not interfere with our work, and I think it will be necessary to have an evening session if we complete the subjects for discussion at this meeting.

On motion of Mr. Cox, of the C., St. P., M. & O., Mr. Latimer's invitation was accepted.

The President—The next business in order is the reading of communications. At the St. Louis meeting Mr. D. H. Lovell was elected secretary of this association. Mr. Lovell's failing health prevented him from assuming the duties of the office, and he advised me of that fact in a letter, which will now be read to the association. On the receipt of that letter I issued a notice to all members that Mr. H. W. Reed, of the S., F. & W., with headquarters at Waycross, Ga., would be appointed secretary *pro tem.* The secretary will now read Mr. Lovell's letter to me bearing on this subject.

Mr. Lovell's letter was read by the secretary, as follows:

ALTOONA, PA., Feb. 2d, 1887.

J. W. CRAIG, Esq.,
President R. M. Association:

MY DEAR SIR—I have just received yours of January 24th, with enclosure, and in reply will say that the arrangement proposed—viz., of appointing a secretary *pro tem.* until our next meeting, or until I am able to discharge the duties—is very satisfactory. The only object I have is to be entirely relieved. I think I am very slowly recovering, but it is very slow. I am in hopes of going back to my home in Renova within a few weeks, but I do not expect to attend to my official railroad business, except nominally, and my physician thinks it is only a question of time and care until I am restored to good health.

I had not been well during the latter part of the summer, and in addition to being very busy, I was doing, I see now, a great deal of hard brain work for our association, and the result was that just as I was closing up the summer's work with the expectation of taking a vacation I broke down completely, my eyes, body and head all going at once.

My superintendent says I had enough to do without the association work, much more of which than you suppose I was doing, and what I enjoyed very much and thought at the time would not be be very injurious.

I will write to you from time to time, as I feel like it, and, so far as I can, I shall take an interest in our association.

Yours very respectfully,
(Signed) D. H. LOVELL,
Secretary.

The President—That you may have a clear understanding of the matter, I will say a word. It is evident that this is not understood by all. At the St. Louis meeting there were officers elected. Mr. Lovell was elected secretary, but was not, as you have learned from his letter, able to assume the duties of the office. It became necessary to appoint a secretary *pro tem.* The explanation made to the association may be perfectly satisfactory, but there are many members not present, and it is necessary for all members of the association who do not attend in person, but have the proceedings, to know what necessitated the appointment of Mr. Reed, therefore the letter of Mr. Lovell, showing the necessity of appointing a secretary *pro tem.* will have to become a part of the proceedings of this meeting. Mr. Lovell's term of office expires by limitation with this meeting, and it is within the province of this convention to decide who shall be their secretary for the ensuing year. However, in the meantime it having become necessary to appoint a secretary *pro tem.*, this letter of Mr. Lovell's, showing what necessitated this appointment, should be made a part of our proceedings, so that all members may know what rendered it necessary for Mr. Reed to be made secretary *pro tem.*, and that is the reason why I wish some member to move that the letter of Mr. Lovell's be made a part of the proceedings of this meeting.

On motion of Mr. Cox it was voted unanimously that Mr. Lovell's letter be made a part of the proceedings of this meeting.

The President—I also have a letter from Mr. Lovell, which I will have read for your information, stating why he could not attend this meeting as your secretary.

The letter was read by the secretary.

The President—On the 16th of last May I made an appointment and called the executive committee of this association to meet in Cincinnati, O., to decide on the questions for discussion at this meeting. We were in session one day, with the exception of Mr. Mills, and one or two were present by invitation. Regarding the subject decided upon for discussion, you have already been advised by circular letter; it is not necessary to read them, suffice to say we have six subjects for discussion at this meeting, and it is necessary, therefore, for us to be promptly on time, that it may not be necessary to send these matters over another year for consideration, and I therefore beg all members to be promptly on time and assist in dispatching our business as rapidly as possible, giving each subject careful consideration. The Roadmasters' Association to-day is not what it was two or three years ago; it has grown to be a recognized authority in the department it represents, and we must show by the work we have done a[illegible] Cleveland that we are capable of intelligently considering the important subjects we have for discussion and worthy the name we represent. I beg all members of the association, therefore, to be present promptly at the appointed hour and dispatch business as rapidly as possible.

The first question to be considered is the minutes of the last meeting. It would occupy a great deal of unnecessary time to read these minutes through before they are confirmed; they are the printed proceedings of the association at St. Louis—you all know what they are. If there is no objection, they will stand confirmed. I hear no objection, therefore the minutes of the meeting of our association held in the city of St. Louis in 188[illegible] stand confirmed by the association assembled at Cleveland in 1887.

Now, the first additional business is unfinished business. The unfinished business which went over from the St. Louis meeting was that of

GUARD RAILS.

Mr. G. R. Campbell is chairman of that committee. Are you ready to report?

Mr. Campbell—Ohio Central—I am waiting for the committee to examine the report and sign it, and I only know that one of the members is present, Mr. Dickson.

The President—I made the committee five in order that it might be reduced to three in an emergency; if there were three here we might proceed with the report. The second question comes first because it was unfinished at the St. Louis meeting and was carried over to this meeting. The next subject, the third, is

STANDARD FROGS.

The chairman of that committee is Mr. P. Nolan.

Mr. Nolan—N. O. & T. R. R.—We have only had a brief meeting, and have not had an opportunity to talk the matter over.

The President—I am sorry, indeed, that we have to pass over so many of these subjects to get a report from a committee. If there are three of you, you should have a report.

Mr. Nolan—Mr. Sloan is a member of that committee; he arived late, and we have not had an opportunity to confer toether. We will be ready to report to-morrow morning at latest.

The President—The next subject is the fourth,

TANDARD GUARD RAILS FOR BRIDGES AND RE-RAILING SAFETY FROGS AT BRIDGES.

Mr. John Doyle—D. L. & N. R. R.—My report is in the same ondition as the others. There are only two of us here.

The President—The next question is

STANDARD TRACK JOINTS.

Mr. Caffrey—Lehigh Valley R. R.—The committees appointed on the subjects heretofore called have made an excuse, and I have to make one too. In looking over the circular I noticed the subject was the fifth, and I had not the remotest idea that it would come up first before the meeting, and therefore felt rather easy about it; as there are three of us here, however, I think we can soon make our report—perhaps this afternoon. The report is well under way, although some documents alluded to in the report were mislaid and have not arrived here yet, but I do not think they will necessarily interfere with our report, and that we will be ready to report by the next session.

The President—That is the fifth committee I have called upon. The next subject is the sixth,

STANDARD RAIL.

Mr. Burnett, chairman.

Mr. Burnett—Yes, sir, I am chairman of that committee, but it being the last, I supposed it would not be first; but the report is ready and can be produced in ten minutes. I will go to the hotel and get it.

Mr. Doyle—I think the reports from the committees should be accepted on motion, and then, after being discussed in the convention, be laid away to be disposed of by another motion. A motion can be made to bring them before the convention, and then, after discussion, a motion can be made to do something else with them, and that will bring the reports of the committees before the convention, and, if necessary, they can be laid on the table until to-morrow, or any other day; in the meantime, if the report is not completed, the committee can be getting it ready to sign. I think the report of the committee should come before the convention for acceptance or rejection, and that no member of the association has any right to discuss that question until it comes before this convention with a motion.

Mr. Preston in the chair.

Mr. Craig—I am very glad that Mr. Doyle has brought up this question. It is absolutely necessary, and the only harmonious way of conducting the business of an association is to have a law governing the same. There are so many of them it is hard to tell which law to adopt. "The object of rules of order is to assist an assembly to accomplish the work for which it was designed, in the best possible manner; and to do this, it is necessary to restrain the individual somewhat, as the right of the individual in any community, to do what he pleases, is not compatible with the interests of the whole. Where there is no law, but every man does what is right in his own eyes, there is the least of real liberty. Experience has shown the importance of definiteness in the law; and in this country, where customs are so slightly established and the published manuals of parliamentary practice so conflicting, no society should attempt to conduct business without having adopted some work upon the subject as authority in all cases not covered by its own special rules." In our system, the one I am connected with—the Plant system—we have an advisory board to our general management, and the proceedings of that advisory board are governed by "Roberts' Rules of Order." If there is no objection made to adopting this law by this association, I will be glad if some member will offer that as a motion. I have it here with me, and will be pleased to learn your views in the matter. It is necessary to have some authority to guide us. There is but one course of proceeding in all societies and assemblies—they must have a law to be governed by, and a good one is "Roberts' Rules of Order." The question is before the association to act upon. I think this is the only harmonious way to conduct the business of the association.

Mr. Doyle—I move we carry on the proceedings of this convention according to the law known as "Roberts' Rules o Order." Carried.

dent (returning to the chair)—Now we can pro-
tle all disputed points according to this authority
rt time.

STANDARD RAIL.

tt—Joilet Steel Works—I have the report here on
ail." The report was read as follows:

dent and Members of the Roadmasters' Association
:

ittee appointed to make a report upon the weight, form
cal construction of railroad rails submit the following:
f rail—While it seems desirable for the increased weight
d tonnage of cars, plus their additional weight, together
rease of speed, to use more metal in the rail, thereby
eater degree of hardness, in as much as this subject is
eiving considerable attention in railway circles, as well
anufacturers of steel rails, your committee are not pre-
in consideration of the quality of rails now manufac-
its weight should be. However, we take pleasure in
r your consideration drawings and blue prints of rail
ht from 60 to 100 pounds per yard.
rail—Your committee recommend No. 4, 5 and 6 of the
g blue prints. Your committee further recommend that
on urge the importance of a standard section for all
we fear the time has passed, if it ever existed, to bring
manufacturers to unite upon a standard section.
cal construction—This opens a volume of which we will
le. 1. All the metal necessary to admit of hardening
fficient to resist the traffic. 2. Perfect rolls and well
e and surface. 3. Rail to be as high as possible with-
other proportions. Base equal to its height. It goes
g that the proper distribution of metal gives the great-
nd durability.

ISAAC BURNETT,
R. A. WILLIS,
T. RAFFERTY,
O. S. JORDAN,
Committee.

, the report of the committee on standard rail was

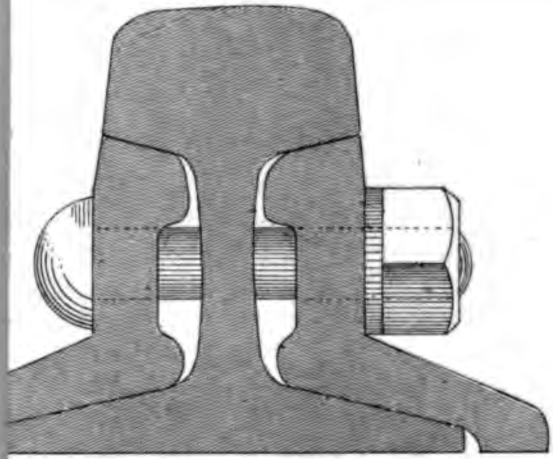
lent—The report is now open for discussion. The
ll take pleasure in giving any explanation of the
hat may be required. We would now be pleased

to hear from any member of the association on that sul You have the report of the committee and the blue prints.

Mr. Burnett—I will say in behalf of the committee tha were widely separated by distance. I met Mr. Rafferty but the other members of the committee I have not seen, had but little correspondence with them before meeting We procured the blue prints as referred to for the associa to examine, not thinking that they would recommend this tion (showing) but this—the form we were working for than the actual weight of the section.

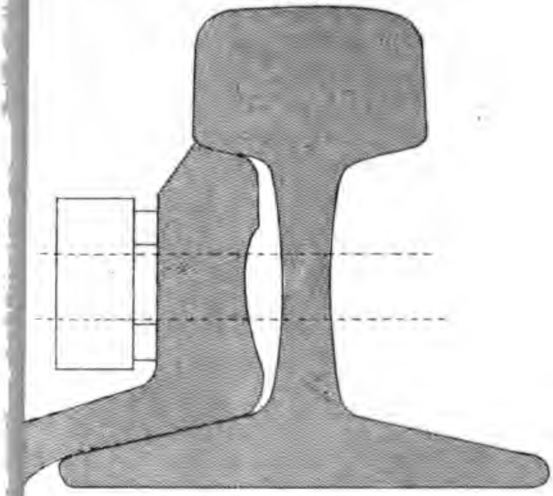
There is the section of the Lehigh Valley of seventy-six po to the yard (showing); here is a rail (showing) that is eig five pounds to the yard, five inches high, and base equal height. This is seventy-eight pounds to the yard. Eith these are good sections, in our opinion, except all have too row a head. The great point to be gained in the manufa of the railway rail is to combine hardness or toughness in composition or construction of the metal; that is, a metal enough to withstand the increased weight of rolling stock, at the same time, having elasticity and toughness sufficie prevent the rail bending or breaking. To attain durability safety to meet the sixty ton engines and thirty ton freight, the weight of cars, it has become absolutely necessary to inc the weight and form of the rail to admit of higher harde properties, which will give a consistency and strength to the modern traffic. Things are progressing, and the railwa and roadbed, although among the last—but by no mann means the least—to receive that scientific and practical sideration that other departments in the railway system already received, come fairly and financially before the rai managements of the country to-day. The fifty-six and pound rails were predicated upon thirty and forty ton en and freight cars of ten tons capacity; whereas to-day they running sixty ton engines and freight cars of from twent thirty tons capacity, over our Western roads, and from 6,0 12,000 freight trains per annum, sixty pound rails must soo a thing of the past, on trunk-lines at least; and while m facturers are able to flux and assimilate American ores in homogeneous metal capable of carrying hardening properties

FIG. 6



78 LBS. STEEL RAIL
41 LB. JOINT.

FIG. 7.



80 LBS. STEEL RAIL.

SECTION OF RAIL WITH REPORT
COMMITTEE ON STANDARD RAIL.

: a uniform wearing surface, except at the ends, shows that xty pound rail will not carry hardening properties enough to serve the ends and warrant safety from breakage. The result attered and flattened ends of both rails at the joint on single k, and the farther ends on a double track, and herein lies greatest complaint with our modern traffic over the light fic rails.

his question of low joints and battered ends seems to be one nathematical calculation. If a sixty or sixty-six pound rail the necessary elasticity and resistance to compression, with dness sufficient to stand the traffic, save at the joints, is it time, then, that the ends of the rails have neither elasticity, dness or physical resistance sufficient to withstand the con- sion, weight or pressure incidental to a level joint, to say hing of low joints? Then, to overcome this weakness at ends, increase the weight, thereby permitting increased hard- s to suit them to the severe requirements of modern traffic, ends must be protected with hardness, elasticity and resist- e against compression and lamination incidental to the cross- of openings at joints, provided for expansion, otherwise bat- d joints will be the result. The value of a chain is the ngth of its weakest link, likewise the durability of a rail is t of its ends. More metal is what is required—and do not it up on top of the rail, but make the head wider and give re wheel contact to the rail, which will give greater wear both he wheel and the rail. A rail with two and three-quarters hree inches at the base of head, with fourteen degree fish- angle, with one-half or nine-sixteenth inch corner radius, l give two inches or two and one-quarter inches when in con- :. That is the foundation, and now let the master car builder the superstructure upon it.

'he President—I would be very glad to have you all come vard and examine these blue prints, and suggestions will be ived from you regarding the report before it is finally acted n.

Ir. Burnett—I should like to hear from Mr. Caffrey on the n of rail.

'he President—Mr. Caffrey will be heard with a great deal of pleasure, and I hope you will all discuss the matter freely. is an important question.

Mr. Caffrey—Lehigh Valley R. R.—I do not know that I ha a great deal to say on the subject of rails. There is such diversity of opinion among all classes of railway men on the ra question now, and it is discussed so scientifically by enginee that any idea I have about rails, outside of what I have learn from the engineers, can not be of great account, and I feel lil giving way to men who have made this matter a study. Tl one important feature I can see now about rails, without goi into a great manv details, and which I am not capable of doin is that the radius of the upper corner of the rail, between whe the tread and the flange come together, is, in my opinion, near right at five-eighths of an inch than any other radius I know Mr. Burnett presents three rails having each a different radi on the upper corner where the flange and a part of the whe meet. One is seven-sixteenths, one one-half an inch, and o five-eighths of an inch, and it is about the only point I wou care to hear discussed, that is as to which is the best of the three forms. I would say that from my knowledge and expe ence, the larger radius presents the best features; that is, tl one having five-eighths inch radius. That is about as far as think I am capable of discussing the rail question.

Mr. Burnett—I fully agree with Mr. Caffrey that the rail qu tion is receiving attention and being largely discussed scient cally by engineers; and also see that Mr. Holley has stated one of his remarks upon steel rails that there were 119 differ patterns of steel rails subject to current order, and 64 per ce were embraced under five weights per yard. How many gines did it require to make 119 different rail patterns? Wl the most of us have to say on the question is from observing behavior of rails in the track, and what better proof can we h of their value; and I fully believe, from what I have seen of so-called "Sayer rail," that the excessive side slope, long cor and narrow head, giving so light a wheel contact, will soon reconsidered. Mr. Caffrey, why do you recommend a fi eighths inch radius and long side slope?

Mr. Caffrey—Because that is about the radius of the whe as made in this country now, and I think the master car build have come down to about that radius for the flange or tread of wheels, or, as they call it, "the fillet;" therefore I think the flange of the wheel at that point should fit closely together. If you have a sharper flange, or rail, you get the bearing in a very narrow space, and it consequently begins to soon cut away the rail or wheel.

Mr. Burnett—My understanding is that the master car builders recommend a half inch! If that is true, would you still recommend five-eighths as the radius?

Mr. Caffrey—No; I think the master car builders have recommended a five-eighths inch radius; however, if the radius of the wheel is to be a half inch, then I would advocate that the rail be the same radius.

Mr. Burnett—In the form of the rail, if the fillet of the wheel is one-half inch radius, and so recommended by the master car builders, would you recommend a change of the wheel to five-eighths, or change your rail to one-half inch corner radius?

Mr. Caffrey—I should prefer the five-eighths—the more bearing you get at that point the better your wheel and rail will wear, as I look at it.

Mr. Burnett—What you gain there you loose on your wheel contact with the top of the rail, do you not? In other words, what you gain on flange wear you do not want. If the master car builders use a half-inch radius for the fillet of the wheel, would you recommend that that be changed to five-eighths, or would you change the radius of your rail to one-half inch to conform to the master car builders' ideas?

Mr. Caffrey—I would certainly recommend that the wheels be changed to five-eighths of an inch.

Mr. Burnett—Well, is that bearing absolutely necessary, or something we do not want? Is it not a wheel base that we want instead? Here is a half inch radius (showing), and there is one and five-eighths wheel contact, and there is five-eighths radius with an inch and one-eighth wheel contact. Now, which would give the greatest valuable wear?

Mr. Caffrey—The object of having this radius, as I understand it, is to get as much flange wear as possible out of the rail and wheel.

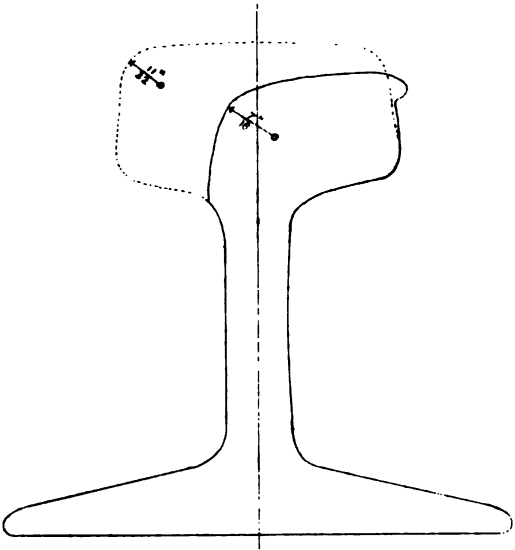
Mr. Burnett—(showing)—There is a rail which was under seven years service on an eight degree curve, and the ra the corner, as worn, is just seven-sixteenths of an inch. worn on an eight degree curve.

Mr. Shea—C. N. O. & T. P. R. R.—I take it for grante this is the most important question before us to-day, that rail. It is very hard at the present time to determine w standard rail should be. One of the most important fe we should consider to-day is the increase of tonnage p over our rails. The tonnage is being increased to such an that the cars are being increased to 60,000 pounds capacit these cars are passing over rails only 50, 53 and 56 pou the yard. The rails are not in proportion to the tonnage p over them, and this is a subject which all of us railroa should impress upon our superiors, general managers, and intendents, that they are not keeping up the rail in prop to the tonnage passing over them as they should. Our one with the heaviest tonnage and engines in the countr are running over a rough country, with heavy cars and curves, and running at a tremendous speed. Our rails pounds to the yard, and the heaviest is 60 pounds. The are heavily loaded, and are marked as cars of 50,000 and pounds capacity. This convention, I take it for granted, to impress upon our managers the great necessity of incr the weight of the rail in use on the road. I do not think important about the radius of the rail so that it is a goo and a heavy rail. If we have a heavy rail we are safe will not have any broken rails. Our general managers, inte in the manufacture of steel rails in the East, West and will get the best ideas to be obtained regarding the radius rail; that will be arranged all right in due time; but it duty to impress upon them the necessity of increasin weight; that is what is essential, and that is all I have on the subject.

Mr. Cox—In increasing the rail in heft, height, and ba idea, in using the many soft ties we do, is to have a larg for the rail, in proportion to the size of the rail, and I s judge, instead of its being 100 pounds to the yard, that from 75 to 80 pounds would be about the standard for our

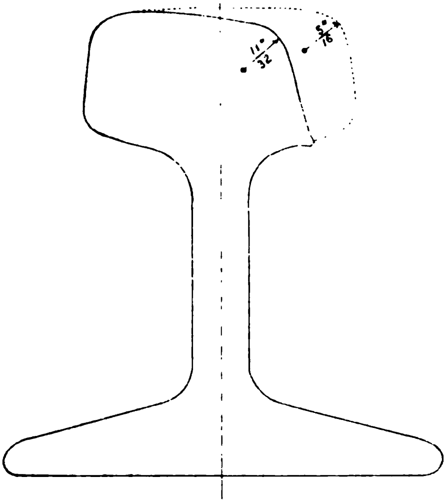
PRESENTED BY I. BURNETT.

60# SECTION AS WORN ON 5° CURVE



4 YEARS

56# SECTION AS WORN ON 8° CURVE 70 FT GRADE.



7 YEARS

.t this time, and the capacity of the cars should be
) to 50,000 pounds.

. Jordan—M. C. R. R.—I sent Mr. Burnett a blue
ıat I thought should be a standard rail for a trunk
dea was 78 or 79 pounds to the yard.

sident—This is the blue print (showing) which you
Burnett as chairman of the committee. What in-
to send him that print? We should like to hear your
with that rail showing what reasons induced you to
ım.

an—I was appointed as one of that committee. We
rom 56 to 60 pounds, and now have 65 to the yard,
t think it is heavy enough; that is five-eighths radius;
ms to kink some; there is not much battering at the
put three ties under the joint—however, I do not
are heavy enough for the traffic over the lines.

. Houghton—W. St. L. & P.—Mr. President, I do not
e can recommend the adoption of any particular
ail; but we can adopt, I think, a certain radius for
cture of all weight of rail, whatever may be thought
əst.

—On our road we are hauling all sorts of cars, from
and I think that most all large lines are doing the
, if not of their own cars they are hauling the cars of
, and I think from 75 to 100 pound rails, for that
uld be adopted. We should have a 75 to 80-pound
business we are doing, I think that is a good standard.

e—D. L. & N. (called upon)—I do not think I wish
he rail question. The 70 or 80-pound rail is some-
road could not afford to buy. We are running as
as anybody else, but if you were going to build a
ıuld be according to your pocket-book, and that is the
ailroads. Of course, a road running into the pine
with light passenger trains, cannot afford the same
. as the Michigan Central or L. S. & M. S., and other
ads; but a rail should be adopted for the tonnage that
er the road. We have a standard 57-pound rail.
the Roadmasters' Association adopted some other
d would use it.

The President—I do not wish you to feel any delicacy in discussing this subject; give your experience, whatever it is. I know there is no member of the association here to-day but has an idea on the subject, and I would like to hear it.

Mr. C. H. Cornell—C. M. & St. P.—I should like to ask Mr. Burnett if he can get a heavy rail and make it as hard and as good as a light rail of 50 or 60 pounds?

Mr. Burnett—I know of no reason why.

Mr. Cornell—I am using a 50-pound rail and it is outwearing the 60-pound rail, and I have insisted that they could not temper a heavy rail as well as a light rail. We might get a heavy rail and a poor article and be worse off than with a light rail.

Mr. Cox—The light rail certainly has the best metal in it, but it pounds up and crooks up with heavy weights passing over it where the others do not—the English metal, however, wears better.

Mr. Swartz—So. Central—Mr. Burnett, cannot you make a heavy rail, a stiffer rail, that will wear longer than the light rail?

Mr. Burnett—I will say that, while I am working with the Joliet Steel Company, I have nothing to do with the manufacturing department, and what I do know about the manufacture of rails I knew as well before I went there as now.

Mr. Swartz—I think the heavier rail could be made better and the difficulty overcome.

Mr. Dickson—C. & P.—Now, the best of the discussion seems to be as to what each individual road is doing, while I think we should discuss the matter and arrive at something for the benefit and good of all roads. We are using a 60-pound rail. We are re-laying it, and find it is too light for the machinery we are using. I would recommend a rail of 75 pounds to the yard. That would make a good, substantial rail, and some roads reach that weight of rail; and if other roads cannot afford that they will have to run upon those rails longer until the time comes that they can. But in adopting this rail we must arrive at something, and my experience is that the 60-pound rail, especially on trunk lines, is too light.

Mr. McInarna—N. Y. P. &. O.—I do not think so much depends upon the weight as the quality of the rail, or the excellence of the material it is made from, and its temperature. If we have a rail of 100 pounds to the yard, that will stand any weight passing over it and will not break, and if it is not well finished, as soon as the surface wears off it must be sold as scrap. Of course every railroad must adopt a rail in accordance with the tonnage passing over it. Our first move should be, I think, to get a rail we would consider free from breakage under the tonnage of the roads we represent. Now, the road I am connected with, the N. Y. P. & O. R. R., has been using a rail 60 pounds to the yard. We have had but few breakages, even in winter, and scarcely any in the summer time, even with a hard road-bed. This year we have adopted a rail 78½ pounds to the yard, and those were so brittle that in unloading them from the cars to the soft ground several of them broke. Now such rails as those may work well, but I do not consider them safe. Though they are soft and may not wear as long as the hard ones, I prefer them. There is such a thing as going to the extremes, which we should avoid. My opinion is that the most profitable rail, so far as weight is concerned, is from about 75 pounds to 90 pounds to the yard.

There is another question we should take into consideration in connection with it, and that is the shape of the rail and of the wheel, and I think that is the most important feature about it. Some would say make the rail conform to the wheel. Now, everyone knows that when you shape the side of the head to the fillet of the wheel the wheel is more apt to climb the rail than if you have a less surface. That has been demonstrated thoroughly in many cases. The question of the dimensions of the rail is not nearly as important, I think, as the other features—that is, the weight and the joint fastenings. The rail may be perfectly smooth and be within three or four years of serving out its life, owing to imperfect joint fastenings, and has to be removed. The C. R. I. & P. road has a machine for cutting them off where they become bruised and warped.

Mr. G. R. Campbell—Ohio Central—We are using a 56-pound rail; it is all our road requires. Our 50-pound rail is a very nice rail. We have a good working rail, manufactured by Sandy Bros., by Coleman, by the Joliet Steel Co., and others. Our last 60-pound rail in use is manufactured here in Cleveland. I do not really understand why we should increase the weight of the rails, but I suppose it is on account of the heavy chinery being put on the roads in the way of locomotives 25 to 50-ton cars. I think it is, perhaps, necessary to incre the weight of the rails. I think the broad-top rail, too, is tal into consideration by general managers as not wearing out wheels quite as fast as a narrow-topped rail. The narrow-t ped rail is somewhat destructive of wheels in the way of we ing holes in them too fast. I am not prepared to say whet a 50-pound rail is the most economical rail, or not. A 67-pou rail, at our last meeting, took the lead and gave general sa faction, so far as I know. On all roads that I have been c nected with, the Pan-handle, B. & O., and other leading roa a 67-pound rail is taking the lead. It is certain that a 50 56-pound rail gives a little better satisfaction in regard to w than the heavier rail. I could not tell why this is so, bu suppose it is owing to the manner of putting it through the r ers and getting the right temperature.

Mr. H. A. Buel—C. M. & St. P.—I am now situated on trunk lines between LaCrosse and St. Paul. We are using n 67-pound steel. We have the Scranton and part of the Beth hem, and I have finished this season with rail of the same h taking out a 60-pound rail of the North Chicago pattern m in 1877, 1878 and 1879, which wore very nicely, but our gene manager thought it was rather light for the rolling stock we using. We are using 45-ton engines on our freight and p senger trains. Our heavy rail is not giving good satisfacti for the simple reason that the ball seems to be very soft. are using a 42-inch angle joint, six bolts to the joint, and if a member of the association can give me the reason why t heavy rail is so much softer than the light I should be ve glad. The ball is very soft. Aside from that it is giving us far as breakage is concerned, good satisfaction, and we are ve much in favor of the 67-pound steel with the same number ties to the rail as with our 60-pound steel.

Mr. Preston—C. R. I. & P.—This discussion started on t form of section of rail, or the weight of rail. Now, so far as t weight of steel rails is concerned, there are many conditio upon which we have to depend—trains, the number of ties, t face of the tie, the distance between ties, the kind of balla and the road-bed complete, you might say, below your rail. Now, in my judgment, we should have a 70-pound steel rail for first-class roads with a traffic like the L. S. & M. S., with from eight to fifteen inches of fair ballast under our track, our ties twelve inches apart, with the best approved angle bar, thoroughly bolted. I think a 70-pound steel rail is heavy enough for any of the roads at the present day, with a good road-bed, while our machinery does not exceed say a 54-ton engine and a 35-ton car. Now there are cars made to-day, and we get them on the western roads, of 60,000 pounds capacity, and which are loaded up to that. I think with the ordinary traffic of most of those roads we might put not beyond twenty-five tons to the car. Say the weight of car and everything is fifty tons, and engine fifty-four tons; now with a 70-pound steel rail and a perfect angle-bar and ties twelve inches apart—and I claim they should not be any more than that—you have a good track.

The President—Gentlemen, we have an invitation here from the manufacturers of the city of Cleveland to take a carriage ride on Thursday afternoon. What is the pleasure of the convention?

Mr. Shea—I think we should not accept any invitations at all until we transact the business that we came here to do—that should be done before we accept any invitations for a ride. If we have the business done by Thursday noon we can then accept any invitation that is offered, and until that time I think we should attend strictly to business.

The President—I agree with Mr. Shea, and I think all members have the work of the association at heart. If we accept the carriage ride in the afternoon it will be necessary to have an evening session.

Mr. Shea's views were concurred in by Mr. Doyle.

Mr. Buel—C. M. & St. P.—We have all of us been in the habit of sitting up a little while in the evening, and I cannot see any reason why we cannot view this city, especially by way of carriage ride, and transact our business during the evening, using the same number of extra hours we are away. I came to see the city and the manufactories, and to get the full benefit of the convention.

Mr. Dickson—Many members have come to attend the convention, and many of them have not been in the city before, and

I think if we do not give them an opportunity to view the ci they will take the opportunity. I am in favor of an eveni session to make up for these excursions.

The President—I do not think we have a member of this as ciation here to-day, or any member of it, who would attend t convention and leave on the last day to see the city, or for a amusement. I came to assist in transacting the business and be governed by a vote of the association, and am perfectly wi ing to abide by that, feeling satisfied that they would not vo for anything which would prevent the proper transaction of t business.

The invitation of the manufacturers of the city of Clevela to accept a carriage ride Thursday afternoon was accepted.

Mr. Preston (resuming)—So far as the heads of the wheel a concerned, I do not wish to discuss that, but believe that t heavier the piece of metal you get together the more liable y are to have poor material; therefore I think a 70-pound rail sufficient for the traffic on most of our main lines now; with t branches I think it should be a little lighter; we should ha our rail in proportion to the traffic over our roads.

Mr. Cox—You suggest 3,000 ties to the mile, that is 17 to 30-foot rail?

Mr. Preston—Yes, sir.

Mr. S. L. Swinney—W. St. L. & P.—I do not know that care to say anything in regard to the radius of the rail to t fillet of the wheel. If we had all new cars and rails that cou be arranged, but as we are running new cars over old rails, a vice versa, it is a difficult matter to settle; but one idea is l sight of, if a practical engineer was sent out to examine a pie of road to decide as to its merit, he would not ask how ma thousand pounds of traffic passed over that road only, but as the weight of cars and engines, and if he had any particul bridge in view he would ascertain, if possible, what the brid would support. It is so with this rail system.

I agree with Mr. Preston that with perfect ties and road-b we would not need as heavy a rail as on ordinary soil with few imperfect ties in the track, but the tonnage in cars is bei increased almost daily. One or two years ago the associati adopted at Chicago a 60-pound rail for light traffic and a 70-poun rail for heavy. Now it does not seem to me that it makes any difference whether 70,000 or 50,000 pounds in traffic passes over the road so long as the number of trains are taken into consideration. More trains will wear out the rails in a few less years than a less number of trains. I think our 60-pound rail is preferable. We have some excellent quality of rail in our 52-pound rail, but the extra weight of cars is doing the rail considerable damage, and for that reason I think it would be necessary to increase the weight of rail. The supporting strength of the rail is mainly in its weight, but the height should not be increased more than the base. A rail five inches high should have a five-inch base. I think that is the proportion of rail used now, and for that reason it would seem that all roads are having this extremely heavy tonnage. You may have the heaviest rails manufactured in this country, and have cars with only 20,000 pounds, 10 tons in them, and in the same train you will have cars of 80,000 pounds, or 40 tons in them. I think the whole question of rail section should be decided by the question of tonnage. If the carrying capacity of the cars are increased to 40 tons it will be necessary to increase the weight of the rail.

Mr. Burnett—In looking the matter up, so far as the form of rail is concerned, there seems to be too great a difference between the half inch and the six-eighths inch radius, but it is desirable to get as great a wheel base as possible; and there is another important factor, they should be all alike, one road should not be one-half inch, another five-eighths, another seven-sixteenths, etc., because the gauge point comes in there. It seems desirable to get a greater amount of wheel bearing on the rail and as little wear of flange as possible on side slope.

Mr. Caffrey—That is only for the locomotives. It is not desirable or necessary for the cars.

Mr. Burnett—Why not?

Mr. Caffrey—We must have adhesion on the locomotive wheel, because the less friction there is the easier the cars are hauled over the road, and the more surface the tread of wheel covers the more friction there is.

Mr. Burnett—I think the law of friction will not measure in that way. A wheel carrying 40,000 pounds will roll as easily on two inches as on one when the surface is smooth.

Mr. Cox—I think the cars draw easier though.

Mr. Burnett—I differ from you. But suppose it does not draw as easy, is it not desirable to have more wheel contact to the rail? It certainly seems to me that there is less contact upon the rail, because there is greater surface to wear upon, and the greater the surface the less wear. I have been over many miles of railroad this season on a hand car, and I think that as the arm of the wheel contact with the rail decreased lamination increased, and to an alarming extent. The wear of the wheel and the rail is extremely rapid, and I find many rails on trunk lines where the wheel contact is less than one inch, and where the weight exceeds the elastic limit of the metal your rail must flatten.

Mr. McInarna—You say it is necessary to protect the ends of the rail by increasing the weight. Don't you think the manner in which the joint is supported has more to do with that than the weight of the rail?

Mr. Burnett—No, sir. You cannot protect the top of the rail by any support you give it. You cannot support it in any manner except by making the rail hard enough to stand the blow it gets. Several roads are using a short bar, 26 and 30 inches long, putting three holes in the rail, and I can see no value in it, but can certainly see a weakness.

Mr. Caffrey—Don't you think you more than reinforce it by the angle bar?

Mr. Burnett—No, sir.

Mr. McInarna—Don't you think the joint with an equal support will obviate the difficulty of flattening out and wearing?

Mr. Burnett—No, sir; not even if you lay it on masonry and it lacks the proportions of a good rail.

Mr. McInarna—Providing you have the proper amount of expansion at the joint?

Mr. Burnett—No, sir; the blow is there, and you must make the rail hard enough to resist it.

Mr. McInarna—It will batter until you have a bridge there to support the rail from the bottom.

Mr. Burnett—That may be so, but my experience is that it is the rail itself, and not its fastenings. I can show you rails in the track to-day, laid with fish-plates, and the same plates are on them to-day as twenty years ago. They are joints with fish-plates, not angle-bars, and to-day it will be on the tie, and to-morrow between them, and those ends are as perfect as any part of the rail, simply because the ends are hard enough to resist the traffic, and that is all. Then let us make the rail hard enough. If 70 pounds won't stand it, let us have 80; if 80 won't do it, let us have 100, and get the hardening properties into the rail. If the tests are properly made with an 80-pound rail, and it will resist the traffic, it is economy to use it, but if it flattens at the end of a 67-pound rail, well kept up, it is necessary to have more metal and hardening properties.

Mr. McInarna—But in preparing the ends of the rail you prepare the whole rail.

Mr. Burnett—You must increase the whole rail as you increase its weaker parts.

Mr. McInarna—But won't the ends give out before the other parts of the rail?

Mr. Burnett—No, sir.

Mr. McInarna—It seems reasonable that they should.

Mr. Burnett—The rail will not flatten; if the weakest point is hard enough it will wear smooth from end to end.

Mr. Cox—As near as I can learn you do not seem to care what kind of an angle-bar you have.

Mr. Burnett—No, sir, I did not say that; I am speaking of the rail and not of the angle-bar.

Mr. Cox—When you lay new steel rail and put a good joint tie in, and never let it down, don't the rails wear out as quickly in other places as at the joints? I have rails laid in 1882, and amongst them are more rails battered at other places than at the joints, and I use a 22-inch angle-joint, and I have as many battered away from the end as at the end.

Mr. Burnett—The weakest part of the rail is at the end. The rails you refer to may have had flaws in them.

Mr. Cox—Now take the 52-pound rail. It is better material and wears longer than any 60-pound rail, and stands double the length of time as regards battering.

Mr. Burnett—It is too light and could not stand on trunk lines to-day.

Mr. Cox—Yes, but in the case I had in mind it had been on

However, I am inclined to think that a
made, will stand any traffic we have in c
least. I do not know anything about th
trunk lines, we must remember, are not
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wear smooth and nice except at the joint,
its weight 16 pounds to the yard it will t
dening properties, so that the ends will w
the center, and breakages will not occur.

Mr. Cox—I think with a double-track
one way, the rail does not wear evenly.
ble in viewing a pile of rails taken out of
will be comparatively sound and the other

President Craig (Mr. Preston in the chair)
much said that I hardly know where to com
place, it occurs to me that to decide the wei
decide what your tonnage will be. If your
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The relation of wheel to rail, *i. e.* the
shall it be

builders having adopted a half inch radius for the fillet of the wheel, that ought to decide the same radius for the rail. If it is not done, it is only a question of time for the wheel and rail to wear to the same radius. This is expensive, for the reason that it wears out the wheel and rail, which can be avoided by adopting the same radius for the rail as that of the wheel. The form of rail is an important matter, and we must not lose sight of that in this discussion. As I said before, your tonnage will decide the weight your rail should be. Now, the form of rail is what you are to decide on, and when that is done and there is no undue wear on rail or wheel, you have solved the problem of the relation of wheel to rail. There are three factors governing the life of rails. 1st. The chemical composition. 2d. The form of rail. 3d. Tonnage. I will not discuss the first for the reason that it is always decided what that shall be by the road ordering and the manufacturer. Second, I have already given my views. The third is the last in the order I have named, but by no means the least, as it forms, in my opinion, the most important factor in the life of rails.

One member said that we could not recommend a standard. We cannot; that is, for every road in the United States, the tonnage varies so over different lines. At the same time we are called upon to report upon what is the best section of rail, therefore we have to take it up and decide the best we can. Some would like 56, some 60 and some 75 pounds, and when a member fixes the figure at 75 or 80 pounds, I suppose he bases that on his tonnage. One member did not know why that should increase the weight of the rail. The reason for that is plain. If we run a 10-ton car we want a rail suitable for that, and for a 50-ton the same. One member took up the question of friction and said it should be less. Now, where will you lessen it? In the rail or wheel? To decrease the friction you must decrease the rail or the wheel.

Mr. Cox—I do not, in speaking of friction, mean that you should not have a good solid basis, but if you pull the same train on a light rail the engine will pull it easier than where the tread covers a larger surface of the rail.

Mr. Caffrey—It seems that the great object of car builders and railroad managers in general is to save the expense of renewing the wheels on account of flange wear. It seems from what I have learned from the statistics of some roads that 25 per cent. or more of the wheels have to be removed on account of having sharp flanges, not on account of wear on the tread at all; and it was to, in the first place, overcome this flange wear, to try to get the wheels to wear as fast on the tread as on the flange, that this radius was made either flatter or sharper, and as I understand it, the object of the master car builders was to preven flange wear in adopting a certain radius, and, as I further under stand it, their object in adopting a large radius was because the thought it prolonged the wear of the flange of the wheel.

Mr. Swinney—W. St. L. & P.—One thing has occurred to since speaking a moment ago, and that is about the wear at t joints, the joints being battered down. I find that nearly all my steel rails with angle bars—the heaviest angle bar we u and the only one is 22-inch—I find that nearly all of the ra are worn off a little at the end. I discover another thing, whe I have some 52-pound steel, it was spliced up with straig splices, with the rail fitting to my notion exactly right, when of the straight splices fit in close to the web of the rail, and course allow the ends of the rails to batter and work togethe but there was from a quarter to a half inch space between eve splice and the rail, those were bolted up with Verona nut lock and in the main have held, and I find the ends of those rails a perfect, or nearly so, and I account for this from the fact th the angle bar is much stronger; it furnishes a kind of angl while with a straight splice you will notice when the locomoti passes over the track slowly the rail bends, the joint has t same motion as the rail, consequently the wear on the head the rail is the same, but with the angle splice rigid, bolted u it is bound to batter.

Now, in regard to my idea of the weight of the rail, if w adopt a standard it should be done for all roads, as light an heavy traffic is passing over almost every road in the Unite States. You cannot adopt a light rail for a light traffic and heavy rail for a heavy traffic.

The President—Speaking of the joints that wore at the en were the bolts tight?

Mr. Swinney—Yes, sir.

The President—I do not understand that, but it seems to that there would be some motion at the joint to cause a wear, a motion of either one rail or the other. If the bolts are all tight I do not see how there could be any wear with the angle splice.

Mr. Swinney—No, the angle splice holds both rails rigid and allows no depression whatever. It allows no elasticity to pass from the joint or the rail dips, or the splice will be bent, because you have your metal in two different shapes.

The President—The deflection is caused by the depression of the two ties supporting the joint, but not in the rail itself. It is not clear in my mind how the wear could occur at the end of the rail if the joints are tight. If it allows the motion of the rails up and down that would cause the wear.

Mr. Swinney—I cannot explain it, but that is the fact. I am positive the joints were tight in both instances. With the angle splice the rails are simply battered at the end. Where I laid it with a quarter of an inch expansion, right between the top of the heads of the rails, it should be reduced to one-eighth of an inch. The opening between the ends of the rails for expansion was, perhaps, from one-fourth to three-eighths of an inch. That was a single track with common steel. I think there was no difference made in tamping. I notice in the straight splices the same defect in the ends of the rails, and the rails wear out I find at the ends.

Mr. McInarna—What is your argument, that the rail is less liable to wear when the bolts are loose?

Mr. Swinney—No, sir.

Mr. McInarna—Suppose you have the rails perfectly tight, no expansion, and the bolts are a little loose, will not the pressure on the rail, when the wheel passes from one rail to the other, cause the action of the rail to be up and down in front of every wheel?

Mr. Swinney—Yes, sir.

Mr. McInarna—Well, suppose you have a straight edge and elevated in that condition for a week or two under a certain tonnage, with loose bolts, won't the space (suppose you put a straight edge on top of these rails) be more, or the difference from your straight edge to the surface of the rail be more than when you commenced?

Mr. Swinney—Yes, sir.

Mr. McInarna—That proves it exactly; it is the loose bolts that does it. The weight on the top of these rails will cause them to depress, so that if you will take a straight edge and put it on the top of these rails, after a time you will find them equal to the expansion between the ends.

Mr. Swinney—I do not pretend to give a theory for it.

Mr. Caffrey—I have a resolution to offer: that a committee of five be appointed by the chairman to consider a revision of the constitution and by-laws, with instructions to report on such revision as they would recommend on the last day of the meeting of this association; the chair to appoint the committee at his leisure.

Motion carried.

On motion of Mr. Cox, adjourned until 8:30 to-morrow morning, Oct. 12th, 1887.

Wednesday's Session.

The convention was called to order at 9 A. M., President Craig in the chair.

President Craig—When we adjourned last evening we were considering the subject of standard rail. If there is anyone that has any further remarks to make on that subject it is now in order for him to do so.

Mr. H. W. Reed (secretary)—S., F. & W. Ry.—Last night early in the discussion the subject ran off the track at a bad joint, and in the wreck of ideas that occurred little was said really bearing on the report of the committee. Many divergent opinions were expressed previous to this catastrophe which indicated a desire on the part of many members for a heavier rail to suit their heavier traffic, while others were content with their ighter rail, and still others inclined to the opinion that no veight of rail should be recommended. Can we not come to-ether on common ground and express in a convincing way a nited opinion, based on facts and experience, that will aid the ailroad manager in this branch of his arduous duties? I take that that is what we are here for. Referring to that portion the report relative to weight it will be seen that the commite recommend nothing, and it is left for us as a bodv to decide is very important question, keeping constantly in view the sire for a first-class track and economy in expenditure. When e weight of a rolling load is increased, friction and consequent ar and the strength of the supports must be correspondingly reased, as a matter of course. If, therefore, there was reason adopting a 50-pound rail for a light traffic and moderate d, does not the same reason exist for adopting a heavier rail much heavier traffic and much greater speed? The natunswer would be in the affirmative, and the most progressive agers in the country are joining in this affirmation.

Now, as to economy of expenditure, I have a case within my own experience. One year one of my principal divisions was laid with 50-pound steel rail, the following year it was laid with 60-pound steel rail, made under the same specifications as to chemical composition. The result of a carefully kept account showed an increased economy of maintenance in favor of the 60-pound rail sufficient to cover the interest and deterioration on the additional 10 pounds, and to say that we have a better track is not expressing it. Now, in view of the divergent opinions that have been expressed and the desire for the report to be sufficiently broad to cover the requirements of all railroads, I beg to offer the following substitute to that portion of the committee's report under the head of "Weight:"

"It is our experience that with first-class steel rail on our main trunk lines where the interchange of traffic necessitates the passage of a heavy tonnage and heavy locomotives at rapid rates of speed on well ballasted and well tied roads, nothing less than a 60-pound rail is sufficient for the maintenance of a first-class track. On unballasted roads the weight of rail should be increased about 15 per cent. to make up for the absence of ballast, and on roads of lesser tonnage a rail of less weight to suit each special case, as determined by competent engineers and roadmasters, should be adopted."

The President—Gentlemen, you have heard the substitute offered to the report of the committee. Has the chairman of the committee any objection to the substitute?

Mr. Burnett—Not any.

The President—What is the pleasure of the meeting regarding the substitute? If I hear no objection it will be adopted as a substitute to the report of the committee. (Cries of question.)

Question put, and the substitute adopted unanimously.

Mr. Cornell—C. M. & St. P. R. R.—We have already consumed a half day in the discussion of this rail question, and it seems that none of us can come to any particular weight of rail; some have a light traffic and some have a heavy traffic, and with those who have a light traffic there are many cars that are heavy passing over their lines. I would say we should recommend a rail of 55 or 57 pounds to the yard, with 3,000 ties per mile, and a tie under the joint—a good tie—and I think we can get a complete track; and I would suggest that this convention decide a

55 or 57-pound rail to be heavy enough for all traffic for the next 10 years, with 3,000 ties to the mile.

Mr. Cox—I think 70 or 80 pounds to the yard would be the better figure.

Mr. Reed—I would make a few additional remarks in reference to the form of rail. We have decided on the weight of the rail by the adoption of the substitute.

Mr. Cox—The substitute says a "60-pound rail."

Mr. Reed—It says "nothing less than a 60-pound rail." You can go to 70 or 80 pounds if you like under this substitute.

I would like to offer, without any preliminary remarks, a resolution in reference to the form of rail. We must confine ourselves to the report. The report says: "1st, weight; 2d, form; and 3d, mechanical construction." I, therefore, beg to offer the following substitute for the committee's report under the head of "Form:"

"A section of the usual T pattern, made with a sufficient quantity of metal in the head to best resist wear, and so formed as to give the greatest strength and economy of material and the greatest bearing surface for both tread and flange, is in our judgment best."

I further beg leave to offer the following substitute for the committee's report relative to the necessary mechanical structure and chemical composition of the rail, which is the last subject under the head of "Standard Rail:"

"The rail should be perfectly straight, without mechanical flaws. It should contain as high a percentage of hardeners as possible to give toughness, and, at the same time, avoiding too great brittleness; these qualities to be determined both by appropriate chemical and mechanical tests and by careful inspection."

The above substitutes were accepted by the committee and adopted unanimously by the convention.

Mr. Reed—Speaking of chemical and mechanical tests, I do not understand that it is our province to go into chemistry here; however, these qualities can readily be determined by appropriate tests.

The President—The next report to receive should have been the first, and should have been acted upon yesterday, but was postponed until to-day for the committee to report. We will now receive it from the chairman, Mr. Campbell.

STANDARD GUARD RAILS FOR FROGS.

G. R. Campbell—Ohio Central R. R.—This report was w in connection with sketches from the different members o committee, and I made a report as near as possible to co to their opinions.

That is Mr. Doon's idea of a guard rail (showing), on you will see that he has 10 feet in front of the point of running about three feet ahead of the point parallel wit main rail.

Here is another one from a gentleman not interested wit committee at all (showing). It has a scale of only one-sixt and is 10 feet in front of the point of the frog and 5 feet ba the point, and is 5 feet parallel with the main rail, and tu off gradually to 5 inches at the end of the guard rail, and is what I made up my report on. This is a series of guard that run back 35 years, if I remember rightly, all kinds of g rails, short and long and awkward, and things picked out scrap pile and spiked down.

I will read the report.

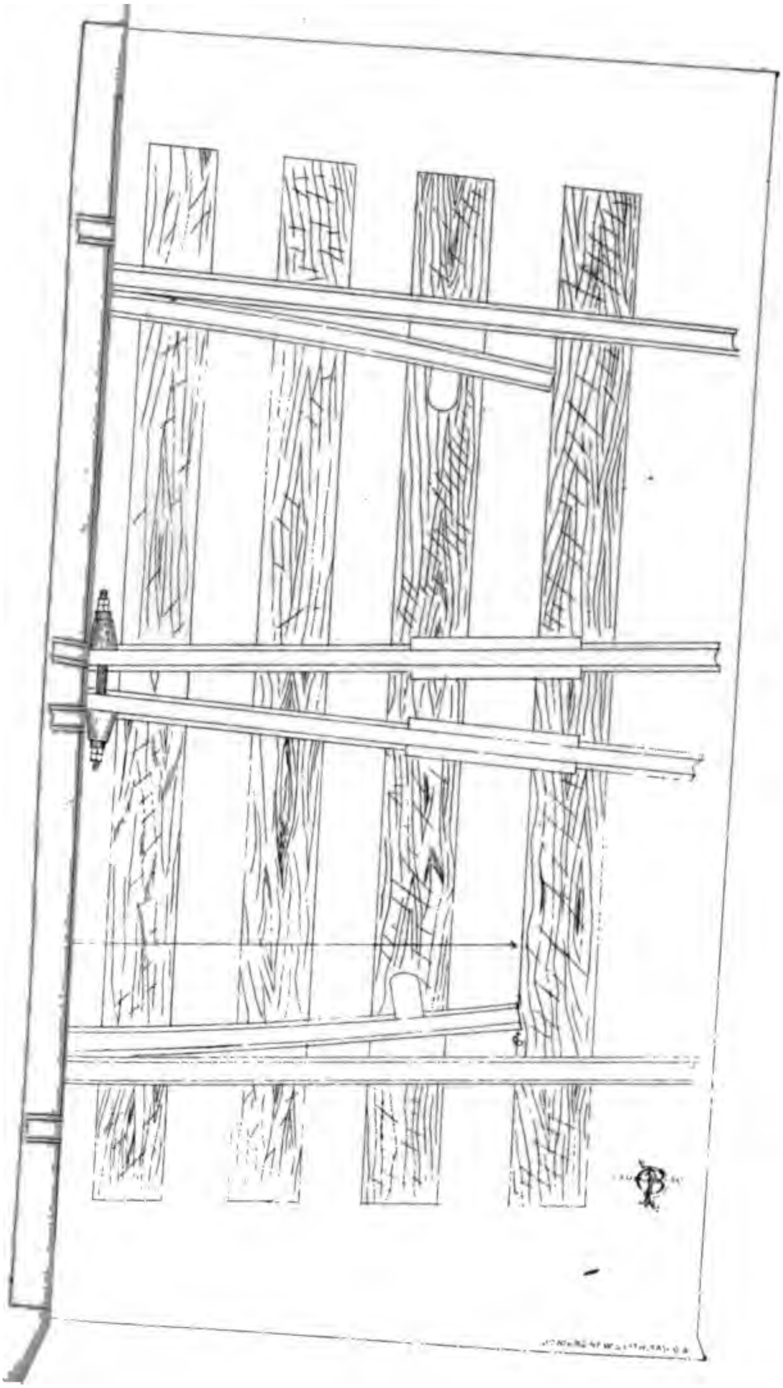
REPORT OF COMMITTEE ON GUARD RAILS.

Mr. President and Gentlemen:

We have the honor to submit for your inspection a few sketc guard rails that we have had in our minds from 35 years back present time, and while there are many in this convention tha say that such and such a guard rail is of no account and neve but they nevertheless have done all that was required of them they were in use, and to-day a 10-foot guard rail for a rigid fro good as one 15 feet long; but we are not here for the purpose of ing on our own personal idea being just right and every other wrong. But we are here for the purpose of trying to get at some that will suit the majority of members present, and by so doi hope to please our chief engineers, general managers and g superintendents.

Your committee have met, and after looking these sketches a have come to the conclusion to throw them into the scrap hea

We will now come to the front with a sketch from Mr. Jo Doon, of the C. & W. Ry., Chicago, Ill. It is a very neat s and comes as near filling the bill as anything I have seen. Yo observe that he has ten feet in front of the point of the frog feet back of the point, and running parallel with the main rail



commencing 1 foot back of the point of the frog and running 3 feet ahead of the frog point, then gradually curving to the ends of the rail, leaving the inside of the guard rail 4 inches from the main track rail, while Mr. Dickson of the Pennsylvania Co., C. & P. division, Wellsville, O., suggests an 18-foot guard rail with flange-way at point of frog 2 inches, and gradually curving from centre of rail to within 18 inches of each end of the rail; and from there he says turn the ends off on a sharp curve, and leave the ends of the guard rail 1 foot from the main rail, which makes a very good and substantial guard rail with one or more rail braces to hold it, as the case may require.

All of the members who were present at our last convention know that my idea of a guard rail is a 15-foot rail, regular quarter circle for rigid frogs. Commencing at and 6 inches ahead of the point of the frog, making the flange-way at that point one and three-quarter inches, and gradually curving each way to the end, which leaves the ends of the rail 15 inches from the main rail. You will remember that it created quite a furor, and some said it was of no earthly account; others said it was a "man killer." I want to say that it has been in use for the last 25 years, and, so far as I know, no man was ever hurt by any of them; and I have the word of over 200 brakemen, pony conductors and yardmen, that they are the best guard rail they ever done work over. They do all that is required of them; that is, they guard the point of the frog, after which they are of an easy, gradual curve, no jerks and no strain on the wing rails of the frog, and instead of its being a "boot jack," like this one and that one, or that one, etc., it gives the brakeman warning in time to get his foot out. However, I did not come here with the expectation of inducing this convention to recommend it as a standard guard rail; consequently, I throw my idea, together with the balance of your committee, into the "scrap pile." Now, we are virtually left without a guard rail. What shall we do?

Your committee have decided to submit this as a standard guard rail for all kinds of frogs, especially for main track:

The guard rail shall be 15 feet long, commencing six (6) inches ahead of the point of the frog, and extending back 6 feet and 6 inches, which leaves 8 feet and 6 inches ahead of the frog's point. This shall run parallel with the main rail 5 feet, commencing 1 foot back of the point of the frog and extending 4 feet in the front of the point of the frog. The flange-way for this distance shall not exceed 2 inches, after which the rail shall curve gradually to its end, which shall have a space of 6 inches between the main rail and the ends of the guard rail—rail braces to be used as necessity requires. Why? Because the point of the frog is the only point to be guarded, and we are of the opinion that guard rails spiked down in this way will serve to level up the trucks before reaching the frog's point.

Your committee has also seen proper to dispense with the filling between main and guard rails, and bolting through and through. And we do recommend a rail brace as the best from the fact that when a guard rail becomes worn on the inside it can be taken up, a piece of the base chipped off, and again set up to its proper distance, giving it a much longer term in the service, and, in order to take stumbling blocks out of the track, we recommend a rail brace made from five-eighth-inch iron, 4 inches wide and 8 inches long, with 3 spike holes, the brace to fit into the neck of the rail tight. That kind of a rail brace weighs 5 pounds each, while the old cast-iron brace weighs from 12 to 15 pounds each.

G. R. CAMPBELL,
F. A. DICKINS, JR.,
J. A. PERRY,
Committee.

On motion of Mr. Doyle, of the D. L. & N. R. R., the report of the committee was received for discussion; and, on motion of Mr. Burnett, each member was allowed five minutes for discussion, not being allowed to speak twice on the same subject provided others desired to be heard.

Mr. Reedy—Vand. Line—When these braces are put on they should be put on where the flange will strike the guard rail first, that is, about where the space is two and one-half inches. I do not like the circular guard rail, they should be bent with the angle.

Mr. McInarna—What is the length of rail?

Mr. Campbell—The rail as represented is 15 feet long, and it runs parallel with the main rail about 5 feet, commencing 1 foot back of the point of frog. The flange-way here is just 2 inches, right opposite the tongue of the frog, but that should be a little closer there than the flange-way is near the tongue, that is, if we are going to have a guard rail to be of any use, but I am of the opinion that nine-tenths of them are of no account anyhow.

Mr. Reedy—There is a motion here (pointing to the spring rail) that we must take care of. If the rail breaks we must have something to hold it. The wheel should travel through a 2-inch space for 8 feet ahead of the point. The spring rail is about 8 feet 6 inches from this end, and if it breaks the guard rail should keep the wheel in its place. Once in awhile the wheel runs along loose, or with a bent axle, and this rail would let go of it. Then I think the guard rail is sprung and holds its place better by holding to the 2-inch space and turning off within 2½ feet of its end with an angle, leaving this rail about 5 inches from the main rail at both ends, and I think the rail should be about 17 feet long.

Mr. G. E. Cain—Wabash Ry.—I see no objection to the guard rail presented by Mr. Campbell. It seems proper in every respect; however, it could be made some safer by bolting a clamp on to the guard rail and clamping it to the main rail. It would then be impossible for the guard rail to turn over, and it would then carry every loose gauge car wheel that would have to pass over the frog.

I have used this style of guard rail for the past two years and now have some 180 frogs protected by this style of guard rail, and they have given perfect satisfaction. I have never had any accident where they were that was caused by an imperfect guard rail. This, I think, is perfect in every particular, and is one I cheerfully recommend.

Mr. Reedy—I never had an accident, but when one driver runs on the frog here (pointing on the board), and passes along to here, sometimes this (pointing) flies up.

Mr. Kerwin—C. & N. W. R. R.—The economy in blocking should be considered—six inches is quite a splice. The object of this guard rail is to protect brakemen and others around the guard rail, parallel with the main track rail, within one foot of the end of the guard rail. Then, I should say, allow a space of 4 or 4½ inches between the ball of the guard rail and the ball of the main track rail, and to run back from 1½ to 2 feet. Then a piece of 2x4 scantling will answer for blocking, and no man can get his foot in the switch. This can be adopted for a guard rail on split switches, and you can get a uniform system of blocking entirely over the division.

Mr. J. A. Perry—Virginia Midland—Regarding the running of the guard rail parallel with the main track, I have this objection: Suppose you have a switch on a curve with the outside of the frog on the inside, the flange of the wheel will hug the outside with the frog on the inside, and running the guard rail parallel your wheel will hug the point of the frog and the inside of the flange wheel will strike hard on the end of the guard rail. If the guard rail runs out gradually the wheel will come in, and you will feel no jerk while the train is in motion.

Mr. Cox—This guard rail suits me. However, I would m
it the same length as the frog.

Mr. P. Nolan—N. O. & T. R. R.—It seems to me that
most important item has been left out of the question, that is
location. I consider a rail spiked in the track as of no use
less in its proper place. I should like to have the commi
show the distance it should be placed on the frog, particul
with reference to 4 feet 8½ wheel cars and 4 feet 9 inch whe
It seems to me to be an important item in connection with t
The master car builders have two standards, as I understan
The only way, in my judgment, is to have an established fi
for both of these wheels, or one with a margin to cover a cer
distance from the running side of the frog.

Mr. J. C. Thurston—C. St. P., M. & O. R. R.—This guard
suits me, a 15-foot guard rail with the 6-inch space at the
but I should like to have it 1¾ inches opposite the point of
and, in the cases of the different gauges of the car wheels, I th
4 feet 8½ gauge would answer the purpose whether there
narrow gauge or not. Regarding the distance of the poin
frog from the guard rail, I would prefer 1¾ inches, 6 inches
tween the point of the guard rail and the main rail, and hav
come gradually up as is shown in the figure. I would lik
15-foot guard rail.

Mr. A. D. Adams—W. St. L. & P. R. R.—I can see no ob
tion to this guard rail. My idea is that the guard rail sh
be of regular width the whole length of the frog and 15 in
from the bend, that gives 2 inches opening, and should have
same opening 1¾ inches, or 2 inches the whole length of the
making the guard rail the whole length of the frog, and
will give you about 16½ feet straight opening or guard rail. A
from that, I think the guard rail is all right. I do not see
that it is a good guard rail.

(Mr. G. R. Campbell, chairman of the committee, here
tered.)

Mr. Nolan—Mr. Campbell, what is the proper distance to
this guard rail from the running side of the frog, that is, t
termine the exact location of the guard rail? I do not k
whether the guard rail is located properly or not.

Mr. Campbell (reading from the report of the committee):

"The guard rail shall be 15 feet long, commencing 6 inches ahead of the point of the frog, and extending back 6 feet 6 inches, which leaves 8 feet 6 inches ahead of the frog's point. This shall run parallel with the main rail 5 feet" (I said 5 feet because that was a compromise), "commencing 1 foot back of the point of frog. The flangeway for this distance shall not exceed 2 inches, after which the rail shall curve gradually to its end, which shall have a space of 6 inches between the main rail and the ends of the guard rail."

That is a compromise between 4, 6 and 7. "At the ends of the guard rail braces to be used as necessity requires."

Mr. Nolan—Why should it not be 1¾ inches?

Mr. Campbell—That would be all right, only the guard rail in that case should not exceed 1¾ inches, but there is a difference in spiking—some spike a little wide.

Mr. Nolan—I wished to find out the exact distance, as some wheels are allowed three-fourths of an inch flange-way and some five-eighths, and that is quite an item, in my judgment, as to the location of the guard rail. The only way to explain the matter thoroughly would be to give a sketch on the black board for the benefit of the members.

Mr. Campbell—I think this report is understood generally by the members present. It says "2 inches," and that, on a 4-foot 8½ inch gauge is enough to let it slip by, and perhaps many men would object to less than 2 inches flange-way.

Mr. A. P. Blue—E. T., V. & G. R. R.—I think before we adopt this guard rail we should establish some gauge, and in establishing that gauge we should take into consideration what is called a defective wheel. As I understand it, all wheels that are 4 feet 5 inches between flanges are considered defective wheels, also 4 feet 5¼ inches. It seems to me that if 4 feet 5 inches constitute a defective wheel we should have a gauge, and gauge the guard rail 4 feet 5 inches from the point between flanges. With the exception of that I like the plan.

President Craig—The discussion of guard rails is an important one. There is no man present in the convention to-day but has had trouble with them. When we consider the service they perform, it is certainly an important subject. Bear in mind the number of wheels it guides over the trunk lines, to say nothing about the side lines. We would like the opinion every man as to what he considers right. The committee su mit, in their report, what they consider the best. It may i be the best; therefore, I would like your opinions general and briefly as possible. We do not wish the opinion of one two gentlemen, but the opinions of all.

Mr. Swinney—It appears from the discussion that the m object is to put down something to protect the track in gene from defective wheels, or trucks off the track, or something the kind. I do not think that should be considered at The only question, it seems to me, necessary for discussion the distance between the guard rail and the main rail to p tect the point of frog. If the track at the point of the frog, six inches back, the proper gauge point, is put to exact gau the flange space in our frog is two inches; why do we w anything else in the guard rail? I like this guard rail, a make it 15 feet long because I can make it for both sides out a 30-foot rail. We require a little additional strength in sp ing it down to hold it, and I do not think it is necessary guard the point of the frog so far away from the point. Campbell gives five feet from the point and thinks that is su cient. I am using quite a number of spring rail frogs and ha had no trouble with them. If we take a 15 or 20-foot rail a put it down the same distance from the main track rail loosen wheels and bend axles.

Mr. Campbell—Yes, loosen up the wheels and perhaps t wheels will make their way through the frog and grind th point both at the heel and the throat.

Mr. Swinney—If we make it less than the flange distance the frog we tear off our wing rail.

Mr. R. R. Houghton—W. St. L. & P. R. R.—It seems to that this form of guard rail is as nearly right as anything can get. Now, as to the proper distance from the point to p it: if all wheels were made alike and gauged alike when p on the axles we would have no trouble in placing the gua rail, but there is a distance in the thickness of the flanges, a in pressing on wheels they gauge from the wearing side of t flange usually, when if there was a uniform side of the flan the wheel could be gauged and the difficulty would be obviat or we might gauge from flange to flange. I have had trouble of that kind, and to determine what was the cause of it I took pains to measure the distance between flanges of the Wagner sleeper, our own coaches, and also locomotives, and found a difference of three-fourths of an inch between flanges, and how will we guard against that? The trouble was the wheels were so close together that they had either to ride the track or the guard rail.

The President—The question of a standard guard rail is what shall be the shape of that rail, and what shall be its position with the point of frog. The distance between the guard rail and main rail is fixed by the Master Car Builders' Association, and the wheels exceeding the limit of 53 inches between back of wheels are rejected; therefore, that is settled. We must discuss the shape of the guard rail and its location to the point of the frog. The distance between the rails is irrelevant, as that is fixed. I mention this so that the members will bear it in mind.

Mr. Cornell—C. M. & St. P. R. R.—I do not think we can get a better form of guard rail than that, only I would like to see it run back from the point of frog the same distance as it is from the head. A train or wheel coming onto the frog would get a quick jerk, whereas if gradually extended back the same distance from the point it would avoid that quick jerk. I like the guard rail, and the only objection I have to it is this, that I would have it extended back the same as at the point. We are studying to make a train of cars ride over the track as smoothly as possible, and that is the question we wish to arrive at. That is a good guard rail, only it should be extended back to avoid a quick jerk.

Mr. Burnett—It seems to me we are running 4-foot 8½ gauge cars over a 4-foot 9-inch gauge track, and *vice versa*. It would be desirable to make an inch and three-fourths on either gauge, on 4-foot 8, particularly in our throat of frog, if it was not for 4-foot 9 cars, and then we would have an inch and three-fourths here (showing). Many claim the frog should be spiked a little loose. That covers a world of sin: "a little loose." [Laughter.] More attention should be used in spiking the frog correctly, whether a frog or switch, at a gauge point. Three-fourths of an inch back of the point should be the gauge in any t and if we use two inches as a throat-way in the frog, two in should be used in the guard rail, in my opinion.

Mr. Dickson—C. & P. R. R.—As a member of the comm on guard rails I would say, last year there was no quoru do business; some tracings had been sent in, but we had ar at nothing decisive. The backs of our flanges are 4 feet 5 in and the backs of our cars in passing through the two-throat the backs of our flanges are hugging the inner rail with a different gauged track they can use a narrower thr they wish, but it must be made so the cars will go through space. I advocate an 18-foot guard rail, with 7 feet from point, nearly parallel with the main track. The guard r proposed had about 14 feet of inner parallel rail 7 feet each of the point. I would be willing to reduce the guard rail feet and have it cut 6½ feet from each center, with one turned out at each end, bringing it down to 13 feet. I been said that a 30-foot rail would make two guard rails. not think there are many roadmasters who would cut a rail for a guard rail. There are many rails with bad ends can be used.

Mr. Richard Caffrey—Lehigh Valley—The master car b ers have fixed the distance between the inner rail of the and the inside of the guard rail, and we all know that that tance is about 53 inches. That settled, it remains to con the length, the form and the position to place it in relatio the frog point. I think a guard rail 15 feet in length is r It should be curved a distance of 2½ feet from each end, the of the guard rail to be about 4 inches from the main rail parallel length of the guard rail to the frog to be 10 feet, that leaves a straight distance of 10 feet in the middle. A center of the 10 feet should extend from opposite the poi the frog, ahead of it 6 feet, and back of it 4 feet.

Mr. C. Warren—C. & A. R. R.—I see no serious objecti this guard rail. There is a drawing here, however, that my idea better than this.

The President—But that is not before the house.

Mr. Warren—Well, I will say that my idea is to have a 18 feet long and make it 6 feet from the end, and have the end to the switch, and as far as having it parrallel with the track, I do not see the necessity of that. After it passes the point of the frog I see no use for the guard rail on the inside of the track at all. With a guard rail 18 feet long, a space 4 inches from the rail there (showing) and running here to the point of the frog, or 3 or 4 inches back, and making a turn around from 4 inches to the end of the rail and the wheel is bound to be carried past the point of the frog in either direction. All we should do is to guard the wheel past the point of the frog, and beyond that we have no use for a further guard rail.

Mr. H. Hutchison—B. N. Y. & P. R. R.—My idea of a guard rail is this. I think it should be 15 feet long, bent 2 feet at each end in the proportion of 2 inches to each foot. This would leave a space of 6 inches between the gauge side of the main track rail and the inside of the main track rail when in position.

As to the position, I would lay it with the center of the guard rail exactly opposite the center of the frog and the distance between the gauge side of the rail and the inside of the guard rail to be an inch and three-fourths. Then at the point where I start to make my bend at each end, I would have that 2 inches.

(Mr. Preston took the chair.)

President Craig—In the discussion of this matter the first thing to consider is what service is the guard rail to perform; and, second, what position shall it occupy, what relation shall it hold to the frog. Now, as to the distance between the guard rail and point of the frog, that is fixed, we cannot change that. The service the guard rail is to perform, as I understand it, is to keep the wheels away from the point of the frog in passing over the frog.

Several members have expressed the opinion that all it was necessary to do was to take the wheel away from the point of the frog just before it reaches the point of frog. I differ from that view. My idea is that the wheels should be brought in line by the guard to pass through the flangeway without any shock to the frog. You are not providing for one pair of wheels alone, if so you could have the guard rail to clear the wheel just before it reaches the point of the frog, but you must provide for two wheels, and those wheels must be guided through the flange-way, clearing the point without damage to the frog or trac therefore the distance of 53 inches, fixed as arbitrary, we wi not discuss, but my idea of a guard rail is that it should ru parallel the entire length of the frog, and from that point to th end of the rail it should be curved gradually so that when th wheels strike the guard rail they are brought in line to pass ove the frog without any shock to the frog or track. If the curv at the end of the guard rail is abrupt, then there is a shock bot to the guard rail and the frog.

Mr. Burnett—Suppose the frog was laying on the outside the curve, what would be the result, and the guard rail on th outside of the track?

President Craig—The track mechanics have given you a guar rail in the frog wherever you place it. The railroad man mus provide a guard opposite the frog, and the question is what kin of a guard rail must we use? The distance is arbitrary, 5 inches—no less. The flangeway being arbitrary, we cann make it any more or less.

Mr. Burnett—Is that absolutely 53 inches, or 53 inches an three-fourths?

President Craig—No, sir. It is 53 inches between backs o wheels, and it is fixed by the Master Carbuilders' Association It makes no difference what the gauge limit is.

Mr. McInarna—Another point mentioned by a few of the members as to the width between the guard rail and the main rail. As you say in relation to the cars, that is a fixed point fo us. The guard rail is fixed, and in that event the guard rail is placed at a fixed point arranged by your fixed frog. It is intended for a standard gauge, and if you increase the width o the gauge of course the distance between the two rails would increase, and hence that is disposed of. The plan of increasing the width of the gauge is already fixed. If left a half inch wide the guard rail must not be thrown out or there will be trouble. The distance is fixed between the running side of the frog and the running side of the guard rail. I like the guard rail on account of its length, for whether laying a new road or an old road, with the frog 15 feet long, we can cut the old rail of 30 feet and have two guard rails, and placing the center of the guard rai at the point of the frog we have an equal distance each side.

like its shape also, running off gradually from the point. It makes no difference as to the length of the guard rail. I should as soon have a 10-foot guard rail as a 20-foot guard rail regarding the matter of guarding the frog, but when longer it can be spiked and supported better, especially when your timbers get old.

Mr. Houghton—I move we add to the report of the committee that the width of the guard rail be equal to the main rail.

The President (Mr. Craig)—Mr. Caffrey has an amendment which is ahead of yours.

Mr. Caffrey—I offer as an amendment to the report that the guard rail as proposed by the committee be recommended, and that a cut of it showing the main rail and the guard rail appear as part of the proceedings of this meeting. Carried.

Mr. Houghton—I move as an amendment to the report that the guard rail be required to be of equal height with the main rail in all cases. Carried.

The report of the committee on guard rails as amended was adopted unanimously.

The President—The next question in order for discussion is standard frogs.

The secretary read the report of the committee as follows:

STANDARD FROGS.

We, the committee appointed to prepare a report on this subject, beg leave to submit the following:

First. We recommend the rigid frog as being best adapted for general use. Length for main line 12 feet, angle 1 to 9, and so proportioned as to have equal clearance distance at the heel and toe.

Second. The filling to be wrought iron, although we think malleable iron worthy of a trial. It should extend 8 inches beyond point, and back to where wing rails are bent, and be so shaped as to snugly fit on the base of rails.

Third. Bolted by from 6 to 8 and ⅞-inch bolts. For yards we also recommend a rigid frog, location to determine angle and length.

JOHN SLOAN,
F. X. GALARNEAUX,
P. NOLAN (Chairman),
Committee.

preference to the spring rail frog. It has been proven
ous trunk-line roads where these spring frogs have beer
and the heaviest cars and engines in the world are con
passing over them, that these frogs are as safe in every
the rigid frog; in fact, when properly made, they are
frog; at any rate, no matter what kind of a road bed y
it has been shown that they are as safe as a rigid frog i
way. They allow the spring rail to open two inches
more—the width of the guard rail from the main track.
is a plate, or brace, fastened to the bottom of the pla
mitting the wing rail to go only two inches, therefor
pressed that amount it is a rigid frog.

It has also been proven that these spring frogs in u
worn from thirteen to fifteen years, whereas the best ri
in use will wear only from two to three years. Th
adopt the rigid frog, which came in use when the first r
was built, in 1835? Why do we not do away with t
switch and adopt the stub switch? It would be as ser
think. I will say in conclusion that as long as we
practice economy, and also taking into consideration
that we wish to make a solid rail, so that you cannot te
is a break there, I say the spring rail is the one to adopt

Mr. Dickson—I am sorry that such a frog should hav
presented to this meeting to be adopted,

to show a spring frog such as I would vote for, and did not expect the question would be brought up to-day.

Mr. J. W. Moore—S., F. & W. R'y—I do not think the rigid frog should be accepted by the convention as a standard frog. The first objection is that the point, if made hard enough to keep it from mashing, will break. There is a large opening, and every wheel gives the point a blow. As Mr. McInarna has stated regarding the spring rail frog, it gives a continuous rail, with no blow at all. I know of spring frogs that have been in use for the past ten years, with a heavy traffic, and are and have been in good order, while I think they have made at the same station at least three changes with the rigid frog within that time. In the second place you have here a bolted frog, and while the trains run at a high rate of speed the bolts will not sit tight but will break or wear off, and you cannot possibly avoid the breaking between the bolt and the head of the frog. I think there should be a better form gotten up than this; at least I will vote against this and in favor of the spring rail frog.

Mr. Cornell—I have no argument to offer on the frog, but I would state that two years ago in Chicago our convention voted on the rigid frog and the plate and riveted frog, and I think our managers who let us come here would probably think we were boys, changing our minds so often from one standard to another. The life of a frog varies from fourteen months to two years, and if we adopt a standard we should stand by it. I have no argument to make on the frog shown in the drawing there. That is a good frog, but I think we should stick to one thing longer.

The President—I would say that the adoption of a standard does not mean that you should follow it for life. It is adopted at the time as the best. I do not recollect just now the manner in which the frog question was discussed at Chicago, but if you will notice the way our subjects read this year, it is what shall be a standard, or what we wish to put on record as an association assembled here as the standard in 1887. However, when we get through with the discussion of the frog I do not think the stiff frog will be anywhere in the race. [Laughter.]

Mr. Cornell—We adopted the rigid frog in Chicago in 1885.

Mr. George E. Cain—W. St. L. & P. R. R.—Well, the life of the rigid frog is two years. That is worn out, and we are progressing now. [Laughter.] I had occasion to take one out a few days ago where we had a heavy traffic, with probably on the average over 1,000 cars every 24 hours passing over it. It was a spring rail frog and had been in two years, and it had given good service and received some little repairs where the rivets had become a little loose. The wear of the frog had not amounted to the one-sixteenth of an inch, while on the other line, with less than 33 per cent. of travel, the rigid frog had only lasted about 14 months with good ties. It appears to be the jar at the point or the wing of the rail that makes the trouble. They wear about two years. Let us by all means have a spring rail frog, something that will prevent this jar. We have a split switch and a spring frog, and it does not matter whose they are, they are what we want.

Mr. Cox—This has been called one of the old things. In 1864 we did away with the spring rail frogs between Milwaukee and Chicago on the Lake Shore, also with the split switch, and put in the stub switch, and now they are doing away with the stub switch and putting in the split switch; but up in Minnesota when we first commenced railroading, 21 years ago last July, we used all spring rail frogs, and as soon as winter came we had no spring to them. Now, for a warm country, I would recommend a spring rail frog. They are better in the summer season than the rigid frog, they ride better as a general thing, but in our snowy country I do not think they are to be recommended; there is a great difference in the country and weather that prevails which I think should settle this matter. In our country they commence using the split switch with the spring, and last spring the first thing they did was to ditch the engine and kill the engineer. This trouble is caused by the snow, and in addition to that, in Minnesota it is so continually blowing that it is almost impossible for a man to shut a split switch with the snow blowing without first sweeping them out.

Mr. Burnett—In your section of the country the snow is no doubt a great detriment to the spring frog, but what would be your opinion if you had a spring frog, to put it in in the spring and use it until the fall of the year, and then change it back to the rigid frog—would it not be a matter of economy?

Mr. Cox—Yes, sir, I think it would.

Mr. G. R. Campbell—Tol. & Ohio Central—There is no objection to a frog with a filling. The only question is which is the best, and I think for its manufacture crucible steel would be the best. If it has a good fastening and is in good shape, perhaps it would be better to have a little curve in the inner rail from the point opposite to the point and back to the heel of the frog, bringing it a little closer all the way to the tongue of the frog which carries the throat of the wheel further along. The Lake Shore road does this also. We take off the sharp point at the throat of the frog, make two angles. I like a good rigid frog. If we can make a rigid frog that will ride as good and last as long as a spring rail frog, it will naturally take the lead of the spring rail frog. I believe a solid wing frog built of crucible steel will do it. I am in favor of that kind of a frog. That will do away with the anxiety of the engineer as to the weakening of the springs, etc., as they dread to run 30 miles an hour over a spring rail frog. I have used spring rail frogs and like them. If we can get something they are not afraid of it will be a feather in our cap. Our springs have always been the weakest thing about our frogs.

Mr. McInarna—Do you think any kind of a rigid frog can last as long as a spring frog?

Mr. Campbell—Yes, sir.

Mr. Reedy—Vand. Line—Could you make a spring from crucible steel, and would it not last much longer than now made of common steel?

Mr. Campbell—I do not know as we want a spring frog made out of crucible steel. The idea is to put a solid filling into a rigid frog and carry the inner rail up to the top and catch the flanges of the wheel so as not to pull the inner rail off the frog.

Mr. Reedy—The spring rail has that now.

Mr. Campbell—You must have something different from what I have seen. I am using the Cleveland spring rail frog, and it is a nice durable frog. It is a bolted frog.

Mr. Dickson—It has been said that snow interfered with a spring rail frog. We have the same snow on our lines and the frogs have worked well.

Mr. Burnett—I will come to the relief of Mr. Cox. He can not have the floor again. Speaking of the snow in this country I spent a part of last winter in the northern country, and I am satisfied it is not practical to use a spring frog in that country when the temperature is 35° below zero, and the wind blowing and the snow becoming so hard that it had to be picked away from the rails. It is not the fall of the snow they have to contend with, but the blowing of it.

Mr. Doyle—I live as near the North Pole as any of you, and we use the spring rail frog, and have for years, and have had no particular trouble in keeping the frost and ice and snow out of the spring rail frog. If it is not out of order I will read you a brief extract from my remarks in our Chicago convention in 1885, as shown in the published proceedings on page 21:

In 1872 on the Saginaw Valley & St. Louis Railroad we put in nine of these spring rail frogs and they have been used every day since with the heaviest trains running over them, and there is one in the yard that every engine coming out of the house has run over every day, and I am certain that frog will last four years longer. The spring rail frog of course requires attention. You may have a frog riveted to the plate, stationary rail, you also rivet the points and some will say the rivets get loose. Well, you can put a bolt through any place and unless the nut is screwed down tight and attended it will not remain firm. If you put a rivet through the plate and the wing rail and it is not riveted down, it will become loose. In putting the point together on the spring rail frog, it has to go together with a bolt or rivet, and we put in a piece of flat iron about one inch by two and a half inches so that we never have any trouble about the rivets coming out of the frog. We have put in stiff rail frogs, and clamped frogs, and bolted frogs, and have not been able to keep one in the track for five years, while it is plain that if a spring rail frog will wear twelve years with proper care and attention, and is equally safe, and a rigid frog will not wear more than four years at the outside, the decision must be in favor of the spring rail frog. The length of the spring rail on the frog we use is about twelve feet. About four feet six inches of it moves back and forth, and it cannot move further on the plate; if shoved up snug, it is a rigid frog. We use a thread and bolt coming through the knee and a rubber spring and iron box on each—you may have a rubber spring or coil spring, which throws it tight against the frog—an then there is a 2¼ by 3¼ strap used on the plate, so that snow or ice cannot raise it up; it must run on the rail all the time, and the rod that runs through keeps the spring rail from expansion or contraction.

I am much in favor of the spring rail frog and split switch. I have seen nothing as good in that line as those two articles, and I notice a number of roads are adopting them.

Mr. Cox—How long do your rails last in that country?

Mr. Doyle—We put in rails that last from two to twelve years.

Mr. Cox—Then is your frog a weaker point than your regular rail?

Mr. Doyle—No, sir.

Mr. Cox—You say your frogs last thirteen and your rails from two to twelve years. I would like to have that cyphered down.

Mr. Doyle—The spring rail frog will out last a rigid frog by five years on any road, is the point I make. At the Chicago meeting two years ago the sense of the meeting was that a spring rail frog was better than a rigid frog, and fully as safe. Now, our president says we must keep up with the times, but here you are with the same inferior rigid frog that you had at the Chicago convention and we voted down. If we were, without any reason being shown for such a move, to one year adopt one frog and another year adopt the other form, it seems to me it would be boy's play.

The President—I do not know that the records of this convention prior to this meeting has ever attempted to make a standard. We have given it as our opinion at previous conventions that a certain thing was the best, but have not adopted it as a standard, if my memory serves me rightly. We have been discussing at every meeting the different splices, frogs, rails and switches, and we should arrive at something definite and say what is the best. I think the time has arrived to say that the convention of 1887 recommends here "A," "B" or "C" as the standard, and, when I say "standard," standards vary; for instance, my friend, Mr. Cox, lives in a cold country, and the standard for the southern country may suit me, but not Mr. Cox, therefore we must ask the majority of the convention to say what shall be recommended as a standard. It is not incumbent on the majority to adopt hereafter what we recommend, but if the majority of this convention says a spring rail frog is the best, why it goes without saying it is the best frog so far as the experience of this association goes. We do not go into the details and say how the frog shall be manufactured; we know the service to be performed, and I will at the proper time give you my views on the blackboard. The records do not officially show to-day that there has been a standard recommended by the Roadmasters' Association of America. I may have overlooked it, but should like to be set aright if I am wrong; but now, in the year 1887, I should like to see you recommend a standard. With a majority of the convention we can adopt a standard as an association.

Mr. Hickey—M. C. R. R.—I have used the rigid frog of most kinds and shapes, but have used the spring rail frog for the last three years. We have about 150 of the spring rail frogs in use, and those we have had in use for three years are still in the track, and we have never changed any of them.

I would recommend the spring rail frog as the standard for main track use; also that they be not less than 15 feet in length.

I would recommend that the rigid frog be used on the side track only, and riveted on to the plate, and to be about 13 feet long; one 30-foot rail will make a frog 13 feet long.

I would recommend the spring rail frog as the standard frog to be used everywhere on the main track.

Mr. McInarna—It has been stated at this meeting that the rigid frog was adopted at the Chicago convention in 1885. I will read the vote at that convention, if you will let me. Mr. Roach, of the O. & M., was the last gentleman that spoke on the subject. Mr. Roach said:

> Mr. Roach—I have had experience with both frogs—the rigid and spring rail frog. I have had a rigid frog in the track for eight years, and it occurs to me that that is very good service for a rigid frog. We should take into consideration the safety as well as the durability of a frog, and in order to cover those two points it seems to me the rigid frog should prevail rather than the spring frog; I would prefer it for safety, yet the spring rail frog I prefer for durability

The Chair—The question whether the spring rail frog, when properly and thoroughly made, is equally as safe and more durable than the rigid frog, it should be understood, is the one we are to vote upon.

The motion was put, and upon a rising vote 23 voted on each side.

The Chair—The vote stands a tie—23 on each side. We will again put the motion, that a spring rail frog, properly and thoroughly made, is equally as safe and more durable than a rigid frog. All in favor of that motion will stand up.

The result was 22 on each side—a tie again.

Upon Mr. Lovell's suggestion that all those voting against the spring rail frog, who had had but little experience with that frog, should arise, was acted upon, and a large number arose.

Mr. Preston—This motion, as I understand it, is: "Is not a spring rail frog, if properly and thoroughly made, as good and safe a frog as the rigid frog?" I will volunteer the statement that perhaps one-third of the gentlemen present have not had more experience than I. Now, if well and thoroughly made—I have not decided in my own mind in regard to it—I doubt whether you have four men in this room who have decided in their own minds what a perfectly made spring rail frog is.

On motion of Mr. Jones, the sense of the meeting was taken on the question of the durability of the spring rail frog as compared with the rigid frog, and decided in favor of the spring rail frog—70 to 0. Also, as to whether a spring rail frog is equally as safe as a rigid frog, when properly made, which resulted in a tie—23 and 23.

Mr. Houghton—I would move that it is the sense of this meeting that a spring rail frog is not as damaging to rolling stock as the rigid frog; seconded by Mr. Lovell, and carried—50 to 0.

Mr. McInarna (resuming)—Another remark. The question of safety depends entirely on the make of the frog. The spring rail must be so adjusted that it will at all times keep on a level or as low as the point of the frog, or at a position where the width at the point is equal to the point of the wheel. If the spring rail by any means should be higher than the point, you have something there that acts to the same purpose as the flange of the wheel. I do not believe in making a spring rail simply by having a loose rail there that will fly open and shut. You must have a spring rail with devices that will keep it in position. The spring rail frog we use is made by the Cleveland Frog and Crossing Works, in this city, and its arrangement is such that it covers all the points. We should have the wing rail of the spring frog so constructed that one of the rails cannot get up out of its place. If properly made you cannot pry it up, but it must be so adjusted that it will keep as high as the point of the frog and no higher.

Mr. Shea—C., N. O. & T. P. R. R.—I will give you my experience with both spring and rigid frogs. Ten years ago our road was laid with spring frogs, we had no other, and to-day we have none except probably one or two. The reason for taking them out was simply because all the accidents on the road were caused by spring frogs. I do not say, or wish to convince anyone, that a rigid frog will last longer than a spring frog, but my experience is, for safety, that the rigid frog is the best, and that it is not as liable to get out of fix as the spring frog. The inner rail of the spring frog usually breaks and gets out of fix, and we changed for that reason, our general managers not considering it safe. Still we have tried spring frogs of other makes, some of the Pennsylvania frogs, and they are doing well, that is, they ride well over the main track. I think, however, the rigid frog is better and cheaper, and by putting in a wing rail we have them all perfect, and that you cannot do with the spring rail frog. Using the same length of iron, and with the spring rail frog I think the spring rail is liable to get too high for the main rail.

President Craig (Mr. Preston, vice-president, in the chair)—To make myself clear on this subject I will use the board. The question is, what kind of a frog will perform the best service? I am not a draughtsman, but I think I can make lines that you will recognize. (A rigid frog was drawn on the board by Mr. Craig.)

The advantage of the spring rail frog over the stiff frog, as you will see (pointing), is that the wheel will not come in contact with any open space, but runs on a true plane. Supposing your joints were all open, how long would it take to convince you that your joints must be closed?

Mr. James Ryan—C. & E. I. R. R.—The advantage of the spring rail frog over the stiff frog is shown at this point (pointing to it on the board). Where the frog is exposed to a high rate of speed give me a spring rail frog, and my reason for favoring them is that I get a uniform bearing from the wheels. If I strike a stiff frog I strike an opening, and in time it works down and there is a jolt; with the spring rail frog it is different, and that is why I favor it and always will. I am not taking a theoretical but a practical view of the matter, for we have had them in comparative use for a long time. I have a spring rail frog in our line that has been down for seven years and I have not spent a nickel upon it up to this time for repairs, and I do not know how much longer the frog will last; and I have stiff frogs of which I have taken out two or three since that spring frog was put down.

Mr. Cox—I should be in favor of a spring rail frog in any country not badly affected by cold and snow.

Mr. McInarna—I am in favor of it in such a country as that.

Mr. Caffrey—I offer the following amendment to the report of the committee:

> *Resolved*, That it is the sense of this association that a frog having a proportion of one in ten is the best for a standard. That the spring rail frog be recommended fer main line use, where practicable, and rigid frog for use in yards, and that all frogs be made in the strongest and most substantial manner possible.

Mr. Caffrey's motion was carried and the original report, as amended, was adopted by a standing vote—34 ayes and 15 noes.

President Craig—We have an invitation from the manufacturers of Cleveland to visit the rolling mills and other places this afternoon; also an invitation from some of the business men of Cleveland to attend a banquet at the Kennard House to-night. In leaving this afternoon on an excursion we consume time which should be devoted to business. The hours that we have adopted are from 8:30 to 12:30, and from 2:00 to 5:00. We have been delayed each day, and the time is rapidly passing; therefore, if the invitation is accepted this afternoon we must have an evening session. We came here to perform a certain service, a certain amount of work. We are looked upon by the railroad world and are expected to perform our duty, and we must perform it, and it must never be said that we failed to perform it. We would not fail in this regard on our lines, and I do not wish to have it remarked that as the Roadmasters' Association of America we have performed our duty otherwise than as men. I hope you will coolly consider this and bear with me in all these matters. What you do is not in the capacity of a local organization—it is a natio ganization. Our proceedings here will go out to the wor we must show that we have applied ourselves in the di of our duties as railroad men always do. Therefore, now adjourn and accept the invitation tendered by the facturers of Cleveland, and this evening we will devote a and a half or two hours to the business of this associati will later meet at the banquet in the hall at the K Hotel.

Adjourned until 7:00 P. M.

Thursday's Session.

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he convention was called to order at 9:15 A. M., President
g in the chair.
he President—Gentlemen, you will please come to order.
must proceed with our business at once in order to complete
work to-day. We are nearly one hour behind in assem-
g. The association adjourned yesterday at 12:00 o'clock to
pt an invitation of the business men and manufacturers of
eland. Before adjournment I announced that we would
e an evening session. After our return from the excursion
as impossible to have the extra session with a full attend-
, owing to the failure of the trains to connect.
e roll was called by the secretary and the following gen-
an was elected a member of the association.

Wildeson..............W. & L. E..............Orville, Ohio.

e President—The subject of "Standard Frogs" was dis-
of yesterday, which was the second question.
Cornell—I would move that only one hour hereafter be
r the discussion of each subject, that each man be limited
minutes. Seconded.
Preston—The object of this is to expedite business no
If that is made the rule and any member has the floor
convention desires to hear him longer than three min-
y can do so, I presume?
f "Question!" "Question!"
rnell's motion was put and carried.

ANDARD GUARD RAILS FOR BRIDGES.

sident—The next subject for discussion is "Standard
ls for Bridges."
rman of the committee, Mr. Doyle, read the follow-
f the committee, which was accepted for discussion:

CLEVELAND, O., Oct. 11th, 1887

To the President and Members of the Roadmasters' Association America:

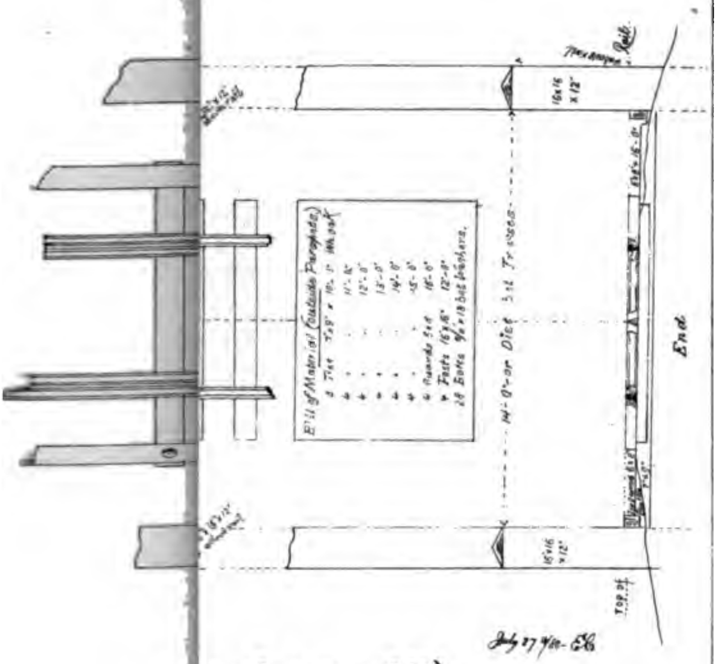
Your committee on standard guard rails for bridges and reraili frogs at bridges would respectfully report as follows: That the b standard guard rails for bridges and rerailing frogs at bridges know of at the present time is the Latimer-Childs combination, shown on the diagram.

[Signed.] JOHN DOYLE,
M. SHEA,
W. J. MCINARNA,
Committee

Mr. Doyle—D. L. & N. R. R.—I heard it remarked by t chairman of one of the committees reporting at this conventi that the standard rail question was the most important questi for discussion at this meeting. I beg to differ from him. I s on the contrary, that this is the most important subject for c sideration before this convention. The eyes of the public a on this subject; they are on anything connected with bridg anything that is calculated for the protection and safety of t traveling public. In looking at that drawing (pointing at t blackboard), it brings fresh to our minds the primary cause many bridge disasters and great loss of life during the year pa and the chances are that at least 19 out of 20 of the lives l could have been saved had that bridge guard, or one-half of been placed around the ends of the bridges where the accide occurred. I use one-half of it, for it consists of two parts, eith of which is accessible. The Latimer rerailing safety guard c sist of the cast iron plates, showing in the drawing, just opp site to and between the bridge guards, the two guards comi together on the center of the track. The heavy 16x16-inch po and the flaring wooden guard rail connected therewith is additional safety guard. The Latimer safety guards are us on many roads in this country, and are considered a great ad tion to the safety of bridges.

(The president here decided that the chairman of the co mittees should not be limited in time in the discussion.)

Mr. Doyle (resuming)—The diagram on the blackboard is design of Mr. J. E. Childs, the gallant general manager of N. Y., Ont. & Western R. R., and this guard rail is the sta ard on that road to-day.



Bill of Material (Outside Parapets)
14'-0" c. to c. of Tr. ...
16 x 16 x 12"
End
Rail
Top of

...ION OCTOBER 1887.)

July 27 '90 - E.H.

MURPHIES NEWS, LITH. SAN. GA.

elieve this Latimer-Childs guard rail to be the most per- uard rail for the ends of bridges yet devised, if not the perfect protection to the bridges themselves that can be ed. It provides completely for putting the cars back upon ails if they are anywhere within possible control, and, if ; will prevent them from striking the heavy posts and being ced before they leave the bridge. We have a number of s from different gentlemen all over the country which can d if the convention so desire.

sident Craig—I will further state here, for the benefit of at the necessity for allowing the chairman more time is for ason that he is familiar with the subject, and he can give robably, in three minutes, in the way of answers to your ions, more information than in a long speech.

. Preston—C. R. I. & P. R. R.—Regarding this safety guard, say that it has been in use on our road for several years e double track. We have not as yet placed it; only in one o instances, on the single track. I find it, as the chairman committee says, and which I fully endorse, to be the best n device at present for a safety guard at the end of bridges. say, further, that I have known two instances where cars been derailed and this device has rerailed them.

e chairman of the committee has fully explained the con- ion of the guard and the uses it can be put to, and I do ink I can add any further to what has been said.

. Cain—I fully concur in Mr. Doyle's remarks and think is no room for argument whatever.

. McInarna—N. Y., P. & O. R. R.—I placed in the track rst one of these guards, which were made about 18 years laced near a bridge on the St. Joseph river in Michigan -degree curve. The year after I left the road a heavy ex- n train came from Grand Rapids to St. Joseph, Mich., 10 or 12 coaches loaded with passengers. The general ger of the road, Mr. Morrison, wrote to Mr. Latimer, and tter was published, stating that when the train was on urve, before it got to the bridge, it was derailed; the pas- rs took hold of the bell rope and their different signals con- the engineer, and he did not stop the train, but continued other side of the bridge, where the coaches were found to be on the track, and they took the track as soon as they reached this point here (shown on the diagram). The casting on the inside is high enough to permit the flange to run upon it and also raise the heavy wheel on the top of the rail. The outside casting is on the level of the road. I will mention another instance that occurred on the N. Y., P. & O. R. R. five years ago when a train was derailed. The car was in such a position approaching the bridge that one wheel was near the center of the track, and if it remained in that position it would strike the side of the bridge, but when it struck the point of the safety rail the car came on the track and then ran to the other side of the track, and the guard on the other side threw it on again, and the engineer continued the speed of the train for the distance of a quarter of a mile, when the train was stopped.

I have a number of letters here from various parties regarding this device.

On motion, Mr. McInarna's time was extended, with the request that the letters in his possession be read.

Mr. McInarna—I have nothing further to remark. I will only read a few of the letters I have here relative to the Latimer Childs safety guard, a diagram of which we have on the board. I will proceed to read them.

The following letters were read:

NEW YORK, October 7, 1887.

John Doyle, Esq., General Roadmaster D., L. & N. R. R., Ionia Mich.:

DEAR SIR—I beg to acknowledge receipt of your favor of October 5th, and send you by mail to-day blue print of the standard bridge flooring adopted by this company in July, 1886.

I would say, in this connection, that we once saved an express train with the Latimer safety guard in the following manner: A steel tire broke on the leading pair of wheels on the forward truck of engine, approaching Lyon brook bridge, which is an iron viaduct 165 feet high. The engine was immediately derailed at a point about sixty feet from the Latimer safety guard. The guard put the derailed engine on the track while it was running at a speed of about twenty-five miles per hour, and, having a guard rail across the bridge, kept it on the track until the train stopped at the other side of the bridge.

While I consider the Latimer safety guard an excellent device for the protection of trains, I can see how it might become an eleme ıd, as they first called on me for a blue print, I am satisfied ıe description of the device which they say all railroads must at they copied as near as they could the plan which I sent The Latimer guard is a patented device in the hands of W. den, 234 South Clark street, Chicago, Ill.

Yours truly,

J. E. CHILDS,

General Manager N. Y., O. & W. R'y.

NEW YORK, February 13, 1886.

ts Spencer, Esq., Inspector of Railroads for the Railroad missioners of the State of New York:

R SIR—Knowing the interest which the Railroad Commis- and yourself have taken in all devices for the prevention of nts on railroads, I take pleasure in recommending to your at- n the Latimer bridge guard, which you no doubt have seen, hich I put upon the principal bridges of this company three ago, and which has since been adopted by the West Shore any.

the morning of the 10th of February our night express train, , consisting of baggage car, two coaches and sleeper, while ng down the grade between Oxford and Norwich (65 feet per at the rate of about thirty miles per hour, broke a steel tire on rward wheel of the pony truck of the engine, derailing the about fifty feet from the Latimer guard. The engine stopped the further end of the bridge, with all of the wheels of engine rain on the track, and no damage to bridge or train.

CLEVELAND, O., —

W. J. Morden, Esq., Sole Owner, Letters Patent Latimer Safety Guard, Chicago, Ill.:

DEAR SIR—Last month as a train was approaching bridge over the Mahoning river, at Warren station, a lo beam caught the end of a switch rail and threw a car off The telegraph operator, standing on the platform of the de above-named station, saw the accident, but the train mei see his signals to stop, and, not knowing there was anythi ran onto the bridge, where a serious catastrophe would l inevitable but for the Latimer railway safety guard, whicl the derailed car in so perfect a manner that no one on knew that it had been off the track.

Last fall I called the attention of the Railroad Commi Ohio to this guard, and ran a hand car off and on the trac him its workings. I also wrote him in respect to this l ment, and he says he will call attention to the device in coming report. Yours respectfully,

CHAS. LATI

Chief Engineer N. Y., P. &

ST. JOSEPH, MICH, Feb. 26t

C. Latimer, Esq.:

DEAR SIR—The safety guard placed at the end of the bri the St. Joseph river at this place has upon two occasions passenger train from going into the river by bringing it t the track after it has been derailed, thus probably saving bridge and the lives of the passengers.

It is an invaluable improvement to prevent accidents pecially when a bridge is approached by a curve, as is the both ends of the bridge at St. Joseph.

I would, therefore, cordially recommend it to the attenti road managers. Yours truly,

A. U. MORRI

General Manager C. & M. L.

CLEVELAND, O., March 10t

W. J. Morden, Esq., Sole Owner, Letters Patent Latim Railway Safety Guard, Chicago, Ill.:

DEAR SIR—Joseph Newman, a roadmaster on the N. Y R. R., reports a brake beam dropping down and catching in throwing a pair of trucks off the track. They ran about a a quarter to Break-Neck bridge, where there is a Latime safety guard, which put the truck back on the rails, wit damage to the train. Respectfully,

CHARLES L

upon the guard at a speed of 25 to 30 miles per hour, and in every the cars were placed upon the rails. Again, when the guards placed at the end of a bridge, it looks as though the company some interest to protect life and property, and I feel sure that if approaches a bridge off the track, and the wheels still upon the of the crossties, the Latimer guard will replace the wheels upon ail nine times in every ten, at any rate of speed. You ask how place the guard from the bridge, I say 100 feet, then, if the els are off the ends of the ties, they are almost sure to pile up e they reach the bridge. Yours truly,

I. BURNETT,

Division Roadmaster Chicago, Rock Island & Pacific R. R.

From the Railroad Gazette, Oct. 22, 1886.

AN ACCIDENT PREVENTED BY RERAILING SAFETY GUARD.

CLEVELAND, Oct. 13, 1886.

e Editor of the Railroad Gazette:

ur comments on the accident on the New York, Susquehanna estern Railroad, printed in your edition of the 8th inst., re-ded me that a serious accident was prevented on our road by Mr. ner's device. The following is a copy of a letter written to him days after it occurred. AUG. MORDECAI.

CLEVELAND, O., Aug. 6, 1886.

Latimer, Engineer N. Y., P. & O. R. R. Co.:

AR SIR—I am glad to be able to give you an account of the ex-nt performance of your rerailing apparatus at a bridge on this ion a few days ago. We are rebuilding a deck bridge near Man-us from certainly a very expensive accident, possibly attended with loss of life.

Yours truly,

[Signed] AUG. MORDECAI,

Assistant Engineer.

On motion, it was voted that the above letters read by Mr. McInarna regarding the Latimer safety guard be received and printed in the minutes of the proceedings.

President Craig—It is not alone the rerailing device we are considering, but guard rails on bridges, which perform nearly the same service.

Mr. Burnett—Joliet Steel Works—I have but a word to say. In January, 1885, we had a flange broken from a freight car wheel, and it left the track and ran a mile and a half with one pair of wheels off the track until it came to one of those guards at a bridge 125 feet span, and it rerailed the car and went within 30 feet of the opposite end of the bridge before dropping off again, and then ran about three-fourths of a mile and was re-railed again at a Latimer bridge guard. It then crossed the bridge at a distance of 75 feet, or a little beyond, and then dropped off again. It then ran a mile and was re-railed again at a bridge on a curve running to the left, and the wheel was broken on the left side of the car, leaving the whole flange on the outside of the curve, and it then ran into a station a half mile away, and when it arrived there the truck was so badly broken that it could not be shoved back into the side track, but they pulled it in with a switch rope. Again, in 1884, we had a bridge of two span, 84 feet each, a three-truss double track bridge, and the hind trucks of one car and the forward trucks of the car directly behind it became derailed, and they were so nearly past the center where the rails come out to a point that when they struck it it was almost a hair's breadth as to which side they would take, but they took the right side, however, and the truck wheels were all replaced on the track, except one pair, and that was the hind pair of wheels that ran about three-fourths of a mile and became detached from the truck and derailed six or eight cars.

The value of the guard in these two instances is almost untold, for had that guard proved a failure the loss would have proved enormous.

ges might have been avoided, the statement might
:ase. We all well know that many serious accidents
rred on bridges from collisions, without reference to
nce this excellent device might afford. We have all
many serious accidents on bridges, resulting in great
and property, which have alone been caused by col-

rey—I have a motion to offer that Mr. Latimer be
by the convention to address us on this very impor-
:t. (Seconded by many, and motion put and carried
sly).

rles Latimer—Mr. President and Gentlemen: You
stand that I have no "ax to grind." The invention
go sold, and I sold it because I could not attend to it.
licited any one to take it that I know of; I never sent
out, and it was through the merit of the invention
s introduced. I say that because I wish it understood
not come before this convention and mingle with you
have any pecuniary interest in this safety guard, but
use I wish to be with you, and that alone, and that
g to do with the merit of the device we are discuss-
me here for the same reason that I should like to at-
convention of the roadmasters, and it is my custom
henever I can.

When I put this guard on the Chicago, Michigan and Lake Shore road, as mentioned by Mr. McInarna, it was full-fledged, and I have made no change in it since only to close up the castings somewhat. The invention stands as first made, an invention clearly and unmistakably for the object intended. I think I am very loth to speak of anything I do, but that does seem a vital point to me, you will understand. Mr. Childs wrote to me immediately after the accident spoken of, and with a great deal of exultation, and thankful that the device was in position, because it had saved many lives. He afterwards stated that he would put a piece at the end of the guard, bringing the wooden guards out from the bridge far enough so that the posts would be struck first if the cars were derailed. Now, when a derailed car passes the center of the track your couplings are frequently gone; indeed, that caused me not to put anything more than the additional guard rail on the bridge, which is all right. I only take credit to myself in the arrangement of the castings and their formation, which is the principal or better part of the invention. I hope you will not consider that I desire to laud myself in this; on the other hand, if it has saved or if it is saving any lives it is a great gratification to me, and I have been delighted to think that I have ever saved any lives, and it is only on that point that I speak distinctly. [Applause].

Mr. Doyle—Mr. Childs claims in his correspondence that this is Mr. Latimer's rerailing safety guard. The plan is all Mr. Latimer's, and is called "The Latimer Safety Guard."

Mr. Latimer—All our guards on the N. Y., P. & O. road are made with that flaring wood-work, precisely as that. I believe that the bringing of the flaring work out further is a very great advantage. Mr. Childs is a personal friend of mine, and I would not detract from anything he might say, yet I wish the matter to be known as it is.

Mr. Chas. McEniry—B., C. R. & N. R. R.—I should like to ask the chairman one question regarding this safety guard. Is this rail continued clear across the bridge?

Mr. Doyle—Yes, sir.

Mr. McEniry—I have heard the remark used that the car after being rerailed got off again on the bridge. Now, I think

ther? I do not claim an iron rail across the bridge.
:xcept the wooden rail is placed across the bridges on
., P. & O., and in relation to the other questions of
f between the guard rails, I have been in the habit of
lozenge at each end for approaches. Mr. Payne when
on the N. Y., P. & O. road took off the extra one,
it was an extra expense, and had a single one at each
e bridge and put them there.

nt Craig—I have some remarks to make on this sub-
ave had some correspondence with managers on this
nd the question with me is and has been, which is the
ortant topic for our consideration. This is the fourth
for discussion, "Guard Rails for Bridges," and, while
aid this and that, on account of its importance should
horoughly discussed. I will say, based upon corre-
between railroad managers and myself, that they are
orward to the discussion on this question with more
ss than that of any other, and for that reason I would
at you give your views freely and fully on the subject
rail. Many of you no doubt have had accidents at
nd know of accidents. I do not wish our proceedings
ore the railroad world and have them show that we
touched one part of the subject and ignored the others
The subject reads: "Standard Guard Rails for Bridges
iling Safety Frogs at Bridges." It should be discussed

officials in one State only, bear in mind, but to those of the whole United States, and I think our discussion should be full and complete before the question is dismissed. It is within your province to cut short any question we may have up for discussion, but I beg that you will consider well your course, and that you are not a local organization, but a national organization. The officials of the roads from the Atlantic to the Pacific are looking anxiously towards this meeting here to-day, and your experience and knowledge should be freely given. We have discussed the rerailing safety device, and I do not think too much has been said or can be said on that subject. [" Good " and applause.]

Mr. Preston—As suggested by the president, the standard guard rail for bridges is the question we should more thoroughly consider. I would simply say this, that in addition to a safety guard and a rerailing guard, the best practice, from my experience, is to use a 6x8 wooden guard rail outside of the rails, with a corner iron inside. Our road has adopted that plan and it seems to work well, and it makes a good guard rail.

The President (to Mr. Cox)—You are next in order, and we would like to hear from you.

Mr. Cox—C., M. & St. P. R. R.—All of our bridges have the guard rail, and I supposed they had them on nearly every road.

The President—But as to their condition and size.

Mr. Cox—I supposed the size used was the same as that shown on the diagram on the board.

Mr. Doyle—This is the rerailing safety guard (showing), and the rail commences at that point and runs clear across the bridge, thus you have a rerailing safety guard and a guard rail, and from the 75 letters I have received from the roadmasters of the country, the majority are in favor of having a point on the bank and the guard rail run clear across the bridge and another point on the end. The guard rail from the running rail is 24 inches. The distance here opposite the point is 4 feet 11 inches, and the guard rail is 6x8.

Mr. Blue—E. T., Va. & G. R. R.—It is necessary to consider the size of the timber. Before adopting the size of the guard rail for bridges, we should take into consideration the size of the ties and the chord. The approach with 8x16 chord and 8x10 ties would not look well. The size of the guard rail should cor-with the size of the tie, and I do not see how we can x8 guard rail to become in general use over the country.

›yle—This is a 7x9 tie.

ırnett—My idea would be to set the guard about 40 feet bridge, and if the derailed cars go outside of your points quite sure to get them down the bank before they get idge. The rerailing casting on the outside of the track to the rail—a case in point where the rails had traveled ır inches and of course carried the castings with them, ıced them four inches ahead of the inside block. A car ·ack came to the guard, and from the uneveness of the it was not placed fully upon the track; however, the ved plainly that the flange of the wheel was upon the and ran some 10 inches and dropped off again. After ırred we placed a rail from the inside casting running bridge far enough to carry the wheel in the bridge in-ıe guard rails placed upon the outside of the main track his guard rail is of pine or oak and 6x8 in size, with an ın upon it upon the inside corner, and should not be ırther than 14 inches from the rail. This, I believe, ıparative safety; however, to avoid wheels with broken ·om dropping off the rail in or on a bridge, I would re-l that the guard rail from the inside blocks continue e bridge from one rerailing guard to the other, and not l three inches from the main track rail. This I believe matter of safety, and safety is economy. Great care ɜ shown in keeping the rerailing block even on the in- outside of the rails.

ımes Sloan—C. & E. I. R. R.—On our road we have o do with guard rails on the outside, and I think there r roadmasters who have nothing to say about them, and think we should take that point up.

ırnett—There are many roadmasters here that do, and ir experience has been in that direction may help others ıey be placed in a position where such work comes under trol.

ent Craig—I will state for the benefit of the gentleman king that I had quite a correspondence on that subject ınagers of first class railroads having guard rails and

desiring to know whether they are in the right place or not,
wishing to ascertain the practical experience and ideas of r
masters. The questions are what heighth, what size, and w
distance from the rail they should be. A great many rail
officials desire to know these things and wish your ideas reg
ing these points.

Mr. Cox—C., St. P., M. & O. R. R.—A guard rail that wi
down south will not do up in our country, in the north.

Mr. Caffrey—Lehigh Valley R. R.—I offer the follo
amendment:

Resolved, That the report of the committee on rerailing de
and guard rails on bridges be amended by adding to it that it t
sense of this association that in addition to the rerailing applia
the guard rails extend the entire length of the bridge, and tha
guard rail consist of a rail of about the same size as the rails i
main track and be placed on the inside of the main rails, and
the distance between the main rail and guard rail be not less
two inches nor more than eight inches.

Mr. Swinney—W. St. L. & P. R. R.—The drawing gives
wooden guard rail outside, but at the same time that is not u
my control, and I wish to go on record as not recommendi
wooden guard rail.

Mr. Doyle—Mr. Cox spoke of a wooden guard rail bein
the way of the snow plow. If it was not set down below
rail it would be, but it must be set out 28 inches, or below
rail, for our large snow plows will strike anything 27 inches o
side of the track unless they are set down even with the rail

Mr. Swinney—I move that this matter be laid over for disc
sion at our next annual convention, and in the meantime t
we confer with the master car builders. Seconded.

Many wished to remonstrate, and the president ruled that
motion to lay on the table was not debatable. A vote was ta
which resulted in a tie.

The President—The question is before the house on the ad
tion of the report of the committee, as amended by Mr. Caff
on standard guard rails for bridges and rerailing safety devi
for bridges.

The amendment was accepted by Mr. Doyle, the chairma
the committee, and the report as amended was adopted b
vote of 29 ayes to 28 noes.

STANDARD TRACK JOINTS.

President Craig—The next question is "Standard Track Joints." Mr. Caffrey is the chairman of that committee.

Mr. Caffrey read the report of the committee.

To the Members of the Roadmasters' Association of America:

Your committee appointed to report on standard track joints beg to submit the following:

Having given this very important subject careful investigation and consideration, we believe that the double angle bar, when properly made, is the best form of joint that we know of.

The essential features of a good angle bar are these, viz.:

1. Having sufficient thickness of top so as to give the largest possible bearing surface under the head of the rail.

2. The greatest thickness and depth possible, so as to fit closely and properly between the head and base of the rail.

3. Having base sufficiently wide to allow slots to be made for spikes to be driven through them into the joint ties to prevent, as far as possible, the creeping of the rails.

4. Having bolt holes of oblong form, and spaced so as the two middle holes will bring the bolts as near to the rail ends as possible without detriment or injury to the rails.

5. Having round or button-head bolts, with elongated neck, to properly fit the oblong hole to prevent bolts turning while being screwed on.

6. Having hexagon nuts with a steel spring washer between nut and angle bar.

7. That angle bars should not be less than 28 inches in length and strong in proportion.

It is our opinion that the joint—a blue print of which is herewith attached—comes nearest to these requirements.

R. Caffrey,
W. Riley,
H. D. Hanover,
A. B. Adams.

The report of the committee was accepted.

President Craig—The report of the committee is before the house for discussion, and Mr. Caffrey will give you any information or answer any questions.

Mr. Ramsey—C. H. & D.—That splice with the elongated holes both outside and inside has caused considerable trouble with the Verona nut locks, permitting one end to get into the long end of the hole. I think the outside splice should h round holes and the inside elongated holes.

Mr. Cain—By use of the small ring washer that difficu can be obviated. The Verona nut lock catches in the oblo nut, tightening up the bolt and becomes nothing but a straig washer.

Mr. Swinney—The object of the elongated hole is to all the rails to expand and contract.

Mr. Burnett—What would be the objection to making round hole in the plate as well as in the rail? Would not t expansion work as equal and smooth in the plate as in the ra

Mr. Swinney—W. St. L. & P. R. R.—The rail in expandi and contracting carries the bolt with it; the bolts and the r both work while the splice should remain absolutely stationa

Mr. Burnett—If you have an inch hole in the plate and seven-eighths inch plate, what is the objection?

Mr. Swinney—You would have the same difficulty.

Mr. Dickson—C. & P.—I do not see that the objection m against using the round hole can be sustained. We have h them both oblong and round and we are now using the obl on both sides. We have had no difficulty.

Mr. Ramsey—C. H. & D.—I think the hole in the rail sho be made large enough to allow for expansion and the bolt sho remain stationary, otherwise the nut lock and the bolt will w and become loose sooner than if not so arranged. Then if were to move away and permit the bolt to remain station there would be little wear on the washer. I think the hole i the rail can be made large enough to permit of expansion.

Mr. McEnery—B. C. R. & N. R. R.—I object to the hole i the rail being any larger than at present, as the larger yo make the hole in the rail the more the end of the rail is weakened. I would say, make the oblong hole in the angle ba instead of in the rail. The hole in the rail sufficient to do th work there is large enough and weakens the rail enough, and think it is better to make the space for the contraction of th rail in the angle bar instead of in the rail.

Mr. Erickson—N. Y., L. E. & W.—Why should not the hol be stationary on the outside of the bolt as well as on the inside It may as well be stationary on the outside as on the inside.

The President—You know from experience regarding the subject we are discussing as to the great trouble we have in railroading, and I would be much pleased indeed to have an expression of opinion from all of you gentlemen. Let us hear something from all of you.

Mr. Shea—C., N. O. & T. P. R. R.—I should like to ask the chairman of the committee one question. Why does he recommend an angle bar of 28 inches? That is wider than we are using for two ties. The joint is the most particular point to strengthen.

Mr. Caffrey—The committee agreed upon that for no very particular reason, only they thought no angle bar should be less than 28 inches. That was really a less length than they thought an angle bar should be. It is a matter for each road to decide how far they will put the slots for spikes from the end of the angle bar.

Mr. Shea—As long as we have a suspended joint and no tie under the center of the rail I cannot understand why it should be that length. I am not in favor of a long bar.

Mr. Caffrey—It was considered that with the size tie we have now that it was not desirable that they should be less than 28 inches in length in order to get the ties in such position as to do the greatest amount of good and be readily tamped up.

Mr. Cornell—Is that intended for a suspended joint, or for a three-tie joint?

Mr. Caffrey—My impression is, while the committee do not say whether it shall be a three-tie joint or a two-tie joint, yet I think most of them had in their mind when they signed this report that it was intended for a suspended joint on two ties. That is my individual impression; whether it was the understanding of the remainder of the committee I cannot say positively.

Mr. Ramsey—C. H. & D. R. R.—Does the committee recommend a suspended or a supported joint?

Mr. Caffrey—That is not recommended; it is left entirely out, and for the convention to decide, if they wish.

The President—I was absent during the reading of the report and expected Mr. Caffrey would decide that point. It would certainly be proper for the committee to recommend one or the other.

Mr. Caffrey—I was chairman of the committee; however I do not understand that we came to any conclusion to recommend either a suspended joint or one having a tie immediately under the end of the rail. What we had in mind was the joint, regardless of the ties, as I understood it; and, as it was stated in the beginning, it was the form of the joint, the position of the holes, and the bolts, and the nut-locks, and any other thing connected with the joint outside of the tie. I, myself, did not think that that was to be considered when the committee was appointed.

Mr. H. D. Hanover—O. & M. R. R.—My impression is that a suspended joint would be the best under a 30-inch plate, or plate 30 inches long.

The President—I shall rule in further discussion that the tie and position of the joint is not germane to the question. We are now discussing the joint, and are not discussing how the joint shall be supported, as I remarked in the beginning of the discussion.

Mr. Nolan—N. O. & T. R. R.—The supports should be the first consideration, and I would like to know what distance apart the ties should be?

Mr. Hanover—Six inches apart.

Mr. Nolan—I move that the ties be considered as germane to the subject. Mr. Hanover thinks that the ties should be six inches apart for a 13-inch plate for a suspended joint. It would be necessary to have two 12-inch ties to keep the joint from moving over. If the ties are six inches apart only, and seven inches deep, I think it impossible to tamp them to give the necessary support. I am, myself, in favor of the plan of holding the bolt stationary in the angle bar. Some gentlemen recommended a washer, which I think is a good thing to keep the Verona nut lock out of the angle bar. I think the three-tie joint is the better joint, and would like to hear from others regarding it—from those who have had an opportunity to give it a test.

President Craig—I will state for the information of the association that in discussing the standard joint the committee will

: decide. If it is a suspended joint we must so arrange t will afford convenience in handling it. In raising the .s necessary to get as near under the rail as possible, hat case it is customary to put the jack between the ' the ties are six inches apart you cannot tamp them. e necessary for us to arrange the slots in the splice, and , as Mr. Shea has said, it is unnecessary to have any aterial in the splice by having them longer. If we dopt the joint upon the tie, or in the space the commit- recommended, it will not do at all. If we put the joint e tie it will be necessary to have three ties, with an lice, otherwise we have no means to guard against the f expansion. If we change the joint on the tie, we must the space, as recommended, and increase its length.

ampbell—Ohio Central R. R.—I see no chance for an it on the three-tie joint. The committee have reported g the holes in the rail, the splices, and everything else spended joint, and the only thing to do is to vote on amend it.

resident—We should decide as to whether it is a sus- joint, or a tie under the joint.

ickson—I think in adopting the angle bar it is neces- define the joint. This, I think, should be done, too, in better determine the length of your angle bar.

under discussion, and exhibit the blue print and have it go into the records as a part of the proceedings of this convention.

President Craig—If there is no objection Mr. Burnett will read that portion of the letter he refers to. After it is read it may be decided as to whether it will be admissible or not.

Mr. Burnett—That is a 40-inch angle bar, and is intended, of course, for a support of a 3-tie joint. I will read from the letter:

MILWAUKEE, WIS., Oct. 10th, 1887.

Isaac Burnett, Esq., Care Roadmasters' Convention, Cleveland, O.:

DEAR SIR—I am in receipt of your letter of Oct. 5th inst., and note what you say. You are probably aware that I have had some considerable experience with splice bars and angle bars, and all the different kinds. My experience has been very thorough, both with suspended and supported joints and with a heavy angle bar, and also with a straight splice bar on a supported joint.

I have always found that a straight splice bar with the joint laid on a good tie was very much more serviceable, holding the rail in position, giving it less lamination, even though the splice bar might be light, than with a heavy angle bar with a suspended joint.

I take pleasure in sending to you a blue print of the angle bar that has been adopted by our company and quite a number of other roads in our vicinity, which is 40 inches long, seven-eighths of an inch thick in the center, and seven-sixteenths of an inch thick at the ends. We have had this angle bar in general use now about two years, and I am satisfied that on the 2,000 miles of road on which we have applied it, it has already saved our company $100,000 in the matter of wear of rails, keeping up joints, alone, to say nothing about the expense of breakage of other splice and angle bars. As an instance of this saving, in 1884 we laid quite an amount of 67-pound steel rail with the ordinary angle bar and suspended joint, except that the angle bar was heavier than usual, being a fraction of over three-fourths of an inch thick. By the spring of 1886 we found very few of the rails but what had commenced to laminate at the ends, some of them quite badly, while others but slightly. We found that at least one-fifth of the angle bars on this lot of steel were either crushed or entirely broken in the time. In the spring of 1886 we took off the angle bars from this steel and laid 40-inch taper bars, putting a good tie under the joint, and we have since found that, although the rails had been pounded to some extent at the ends, as above stated, with the suspended joint, yet that we have little or no trouble in keeping the track up with the 40-inch bars and supported joints, and that the rail has shown little or no further wear since the long angle bars were put on. All the new steel that we have laid since the spring of 1886 has been laid with this long angle bar and supported joint, and the universal verdict of our track men, division superintendents and roadmasters is that they have a very much better track with a very much reduced cost in the way of keeping up joints, and that there is no lamination at the ends.

The only difficulty that we encounter with this long angle bar is this: You are probably aware that it is almost the universal custom among all track men in surfacing track to put their joints up somewhat higher than they do ties in the center of the rail, the result with the old joint being that the joint with the old angle bar will soon be as low, or lower, than the center of the rail. Unless special instructions with the use of the 40-inch taper angle bar are issued they will do the same with them, the result being that they will stay up to the portion they are put and not settle any more than any other position of the rail, thus causing the truck to ride roughly from what roadmasters know as high joints. With very little instruction, however, this is overcome in the surfacing of track.

Yours truly,

[Signed] J. T. CLARK,
General Superintendent.

It was moved, seconded and carried that the letter above referred to be made a part of the proceedings.

Mr. Burnett (resuming)—Mr. Clark was a very able roadmaster of the C., B. & Q. for many years, and is now general superintendent of the C., M. & St. P. I have had some experience with that form of angle bar (showing a so-called "Sayer angle bar"), and will say it is the best bar I have ever seen when made of steel. I have never used any of that form made of iron, but considering the difference in cost between iron and steel of to-day, I would certainly recommend the steel bar. It has strength and lateral resistance, and the vertical resistance is much greater than that of the iron. I should not want the steel very hard.

Mr. Shea—Mr. Burnett, what is the cost of the 42-inch steel angle bar compared to the iron bar?

Mr. Burnett—I am not prepared to say.

Mr. McInarna—We want the best regardless of the cost.

Mr. Burnett—The cost should cut no figure whatever.

Mr. Shea—All railroads cannot now afford to go even to the expense of the angle bars without desiring to know from us as the Roadmasters' Association of America as to the difference in the cost between iron and steel. Many roads in this country

have hard work to maintain their roads now, and when
ditional cost is put on them they should know at lea
it is.

Mr. Burnett—I think no road, through either real o
nary lack of funds, should buy an inferior angle bar an
than they would an inferior rail, and it is the angle b
helps preserve the rail, and if you have an angle bar t
do the work and make the rail as stiff and strong at t
and capable of resistance as the solid rail at other po
expense should cut no figure. Mr. Clark's bar is recom
very highly, and, if necessary, and you want a suspend
you can cut off his bar and get a good shaped bar 26 inch
however, I would prefer this, the Sayer bar, particula
suspended joint is to be the rule.

Mr. H. A. Buel—C., M. & St. P. R. R.—I am now us
bar Mr. Burnett mentions and a suspended joint, and
to be the most complete joint I have ever seen yet. I ha
heard of one of those splices breaking. The swell in th
gives it the strength required.

President Craig—We have that joint before the associa
its adoption. We have one of two things to do to ad
joint as it is. We can amend the report in any way the
of the convention may decide, or recommit it to the co
for further report.

Mr. Cornell—C., M. & St. P. R. R.—My division lies
with the one where this joint is used. We have a sus
joint which we have to raise and tamp, whereas on ot
allel roads they stand perfect at all times with this long

Mr. Burnett—How is the ballast and traffic of one road
pared with the other?

Mr. Cornell—About the same.

Mr. P. Nolan—From the expressions of those who ha
experience in testing the 3-tie joints, I feel now convinc
it is the best, and I have so thought for some time. I
like to have the length and position of the ties decided u
the proper amendment made to the report to be adopted
association. I think it should have six bolts and the bar
at the end—by no means in the center.

Mr. Cox—Those Mr. Burnett speaks of are slotted at t and not in the center, and I think they make the best joints of any thing I have seen or used.

Mr. J. A. Perry—Virginia Midland—I have had a little experience with the 42-inch and 24-inch bar, and can see but little difference. We have a tie under our joint and all the benefit I can derive from the long angle bar is that it keeps the rail from creeping and battering the single joint tie. So far as keeping the track in line and in service is considered, I do not know that I have derived any greater benefit from any than I have from the 24-inch angle bar. I have used it on the same ballast and upon the same location of the road, and my experience has been that the short angle bar does as well as the long one. So far as the bolt is concerned, nothing has been said regarding this by the committee. I have some objection to it. I prefer a square nut. With an inch and a quarter nut we have no trouble in taking them on and off at the angle bar because the surface is so little. I have had some trouble with the others. We have adopted the inch and a quarter square nut.

Mr. Cox—We use a square nut. Let me ask you a question. How long is your angle bar?

Mr. Perry—Forty-two inches, with one tie under the joint.

Mr. Cox—What do you do with the end of the 24-inch angle bar?

Mr. Perry—I have none under the end, only under the joint.

Mr. McInarna—You used the common splice, I presume, before the angle splice was adopted?

Mr. Perry—Not with the kind we have now.

Mr. McInarna—What was the difference in keeping up the joint—the common joint—with the tie directly under the joint, compared with the amount of labor with the joint suspended?

Mr. Perry—I have had no experience with the suspended joint, and could not say anything about that.

Mr. McInarna—Do you use a short angle splice with a point in the top?

Mr. Perry—Yes, sir. Our angle bar is slotted in the center; our ballast is rock and gravel, about half and half. We have had no trouble with the angle bars breaking with the tie under the joint, but I have seen them break with the suspended joint.

Mr. McInarna—Does not the slot in the center weaken the splice?

Mr. Perry—No, sir, not if there is a tie under the joint, but with a slot under the center or with a suspended joint it is different.

Mr. McInarna—I thought you indicated a few minutes ago that you experienced no difference between a suspended joint and a joint on the tie?

Mr. Perry—I find that we do away with all the trouble by having a tie under the joint.

Mr. McInarna—Yes, and the fact that you break the angle bars proves to me that the suspended joint is weaker than the joint upon the tie. I wish it to go on record that I always favor the joint upon the tie.

Mr. Reedy—Is the long angle bar of 42 inches too light? Is it made like this? (Showing.)

Mr. Perry—Yes, but not so heavy, although we have had no breaking. It is slotted in the center and at both ends.

Mr. Reedy—I have seen some of those long angle bars that were no heavier than the short ones; in fact, they were of the same weight and slotted in the center. I think the angle bars should not be slotted in the center. The tie under the center should be permitted to give its full support to the center of the bar, and not be moved with the train coming into stations, by water tanks and such matter. I think the long bar is better than the short one—42 inches long with a tie slotted at the end, with no slots in the center, is about right. The bar we have in use on the 4½ rail is not thick nor heavy enough, and is not made right; it is not made to stand the strain, weight and blow that comes upon it.

Mr. Cox—Where did you see the 42-inch angle bar slotted?

Mr. Reedy—I saw one a few days since, it was slotted within one inch and a half of the center.

Mr. Phil. Rielly—P. & N. Y. C. R. R.—We use the 40-inch bar, and the slot is cut into the body of the bar, and does not extend to the outer edge. We think it is a good joint. We have used the short brace suspended and have almost given them up.

Mr. Burnett—Mr. Rielly, if the short bar of the same weight and proportion as the long bar were used, would it be as good as the present one, and then what would be your opinion as to its use as compared with the long bar?

Mr. Reilly—I do not think it would be quite as good. We use a joint and three ties.

President Craig—The improvement, then, is in lengthening the bar.

Mr. Reilly—Yes, sir, and in strengthening it.

Mr. Burnett—Do you consider that after you go 6 or 8 inches each side of the joint, the end of the rail proper, that your heavy bar from there out is of any value more than for its resistance to moving of the rail; or, in other words, if the bar was tapered?

Mr. Reilly—I think it would be much better if tapered toward the end; it would give the rail elasticity and strength at the joint.

Mr. Shea—C., N. O. & T. P. R. R.—Don't you get your strength from the rate of speed. In other words, does not your angle bar not have more power under 70 pounds weight than if 60?

Mr. Reilly—Yes, sir; there is no doubt about that.

Mr. Hickey—M. C. R. R.—We have been using the 44-inch angle bar. Those bars have six bolts, and the center tie is directly under the joints, and the slots so cut that it is in kind of an angle. We use a broken joint. They give good satisfaction, and I prefer them to the 24-inch angle bar. We have had some steel splices of the same heft, and before we got the ties placed under the joint they broke, but when properly in place they do not break.

Mr. Nolan—Could you check the creeping of the rails by having it slotted at the end?

Mr. Reilly—I should not wish to try. Your ties will run together. The angle bar which I mentioned broke in the slots. I am in favor of having the angle bar taper from the end, and I think our folks will have this done.

Mr. McInarna—In comparing those splices, the 44-inch with the 22-inch, after a certain length of time in use, how do they compare with each other in regard to bending in the center? Is the long splice more bent than the short one?

Mr. Reilly—I do not think we have a bad splice among the whole of those long splices. Some of them were bent sideways, and one of them was bent down; we had no trouble from breaking; we have very few loose bolts, or broken ones; we use t Verona nut locks.

Mr. Preston—I have had some experience with this angle ba the diagram of which we have here (showing). It is of the sa steel, kind and weight I have had in use about three years. T bar is 26 inches long and weighs about 45 pounds. I find makes a very good joint. We are using it for a 70-pound ste rail. I have had no trouble with it until I made a suspende joint of it. Two good ties under each end of the bar and spike in holes cut in the side of the angle bar I am satisfied, in m mind, makes fully as good a joint, if not better than anythin I have ever used. The bar is 40, 42 and 44 inches long. M theory always has been, however, that a 26-inch angle bar long enough, unless we can get a bar tapering from the midd to the end—or say we have from 20 to 26 inches straight in t center. Anything longer than that is of no use that I can se particularly so long as you use a tie under the joint.

President Craig—I should be glad to have some member off a motion to have Mr. Latimer give us his views on the subje in this way—it may be done formally, as Mr. Latimer is not member of the association. We are always glad to hear fro Mr. Latimer.

Mr. Burnett—I move that Mr. Charles Latimer be requeste to give his experience on the suspended and supported joint.

Seconded by many and carried unanimously.

Mr. Latimer—The rule I always used and advocated in lay ing track was "joint on tie" every time. When angle plate came into use I changed to suspended joint. I now admit tha we made a mistake—the angle splices should also have bee laid joint on tie. In this I do not touch the question of other su pended joints. [Applause].

On motion it was decided—Mr. Caffrey only voting in the ne gative—that the report on "Standard Track Joints" be recom mitted to the committee for future action.

President Craig—It will be necessary to have an evening se sion to complete our business, and the question of standard ha cars should be disposed of before we adjourn.

The report of the committee on standard hand cars was re by Mr. Stimson, the chairman of the committee, as follows:

STANDARD HAND CARS.

Your committee on standard hand cars beg to offer the following report:

That we recommend a car capable of carrying a gang of from 3 to 10 men, and necessary tools, at a fair rate of speed.

The car should not exceed 550 pounds in weight, the gearing being about 3½ times to 1, and the cost of the car not to exceed $45.

W. B. Stimson,
D. McIntaffer,
A. J. Diddle,
Chas. Melville,
P. K. Roach.

After some little discussion on the subject of "Standard Hand Cars," it was moved by Mr. James Sloan, and carried, that the report be referred back to the committee as amended by Mr. Isaac Burnett; that the record of discussion be erased from the printed proceedings of the convention.

President Craig—That disposes of all the subjects for discussion. We will have an evening session and I will name the hour as 7 o'clock; meantime, we will have a carriage ride about the city, and as we do not depend upon the railroads this time I think we will come together in time. [Laughter.] The subjects for this evening's consideration will be the revision of the constitution and by-laws, election of officers, and a decision as to the next place of meeting.

Mr. Ryder, photographer, of the city of Cleveland, desires to take a photograph of the Roadmasters' Association, and if you will please walk around the corner to the little park by the lake it will accommodate him.

Adjourned until 7 o'clock p. m., the convention in the meantime proceeding to the lake front to have their photographs taken.

The convention was called to orde
dent Craig in the chair.

The President—Gentlemen, give n
We adjourned at 12:00 noon, to assen
nouncing the subjects for our consider
you three and omitted one, which wa
port of the committee on deaths. If t
mittee is ready to report we will recei

Mr. S. L. Swinney—W. St. L. & P.-
our committee:

Mr. President and Gentlemen:

Since our last meeting, one year ago, d
of our brightest and most useful members

Mr. David Coleman died at Topeka, I
typhoid fever, after an illness of only four
death he was only 44 years old. He was b
Ireland, and came to this country in 184
nia, and remaining there until 1868, whe
Kansas, and engaged in the construction c
and soon rising to the position of general
He left there to take charge of the constru
lington & Northern Railroad, and after i
time of his death, was holding the positio
dent. Mr. Coleman was a man of irrepro
death is regretted by all who knew him.
a very serious

mittee be received and placed in the proceedings of the
on.

reston here took the chair.)

ent Craig—The next thing is what is to be done regard-
rinting and publishing of the minutes of this meeting.
ons and recommendations are in order. I will give
views. My idea regarding the printing of the minutes
eeting is that it should always be in the hands of the
on; that is to say, that the executive committee should
matter in hand and have the proceedings printed on
possible terms. You have confidence in the executive
ee, as shown by the section in our by-laws making it
aging committee of our association. If there is any
who would not like to place this matter in the hands
ecutive committee, he can object, and if there is no
I should be pleased if some member would offer a
n to that effect, which will very readily dispose of this

ent Craig returned to the chair.)

eston—I move that the matter of printing the proceed-
his meeting be placed in the hands of the executive
e, to do the best they can in the interests of the asso-
nd would suggest at the same time that instead of
to some newspaper or periodical to print and receive
fit of the advertisements, that this committee see how

that the *Railway Age* last year published the book, and pu lished 1,500 copies, and sent them all out without any expen to the association except the expense for postage on the boo sent out. If the executive committee can do better than th they should do it, of course. I simply state what has been do heretofore. Every year since we have been an association, cept one, they have published the books of our proceedi gratuitously.

Mr. John Sloan—I would like to say that the *Railway* sent in a bill of $126.00 for these books, and that they kept books and sold many of them before the members recei them.

Mr. Burnett—I know nothing of that.

Mr. Caffrey—I move an amendment, that instead of leavi the publication of the proceedings of our annual convention the executive committee, that it be left to the secretary to tend to that duty.

Seconded.

Mr. Preston—I accept that amendment.

President Craig—Gentlemen, you have heard the motion Mr. Preston also the discussion on the subject, and the amen ment of Mr. Caffrey. If other members wish to make any marks regarding it, or if you desire to call for the question will put it.

Mr. Swinney—I do not know but it would be imposing much labor on the secretary, while it would be as easy for members of the executive committee to do this work as for secretary. They are quite well distributed around over country and each individual member could interview parties his immediate neighborhood who would desire to have adv tisements inserted in the book, and in that manner could lieve the secretary of much labor. You well know that have not paid the secretary munificently heretofore, and p sume we will not in the future, and I do not think it is right call upon him to do nine-tenths of the work of this associati for comparatively nothing. I was a member of the executi committee for two years, and if I could would gladly assist h in any of the duties.

Mr. Caffrey—It occurred to me that even if this work delegated to the [illegible] obliged to do the [illegible] the work as well. [illegible] executive committee [illegible]

President Craig—I [illegible] I do not know who [illegible] was secretary I should [illegible] hands of the executive [illegible] whom to confer, they [illegible] save the criticism of [illegible] late.

Mr. Myers, repres[illegible] and was permitted to [illegible]

Mr. Myers—It has [illegible] in to this association [illegible] the proceedings of your [illegible] lished the proceedings [illegible] arrangement made last [illegible] ously done—that we [illegible] nish to the association [illegible] the hands of the secre[illegible] tising in the book for [illegible] that we should do more [illegible] last year, which we did [illegible] sent out from the office [illegible] ence, and an understanding [illegible] sociation and the *Railway* [illegible] sociation would, if able [illegible] not in our contract, but [illegible] was low in funds and [illegible] and the *Railway Age* [illegible] have a letter in my po[illegible] for postage has been paid [illegible] matter is now settled. [illegible] of the book of proceedings [illegible] gratis. I felt called upon [illegible] made this statement. [illegible] entirely welcome to [illegible] association.

Mr. Preston—This is really all news to me. I simply proposed it in that shape to get it before the convention. I never had heard how the printing had been done nor anything about the bill that had been sent in.

The President—The question is on the adoption of Mr. Caffrey's amendment to Mr. Preston's motion.

The amendment was voted down unanimously.

The President—Now the resolution of Mr. Preston is before the house.

Put and carried unanimously.

Mr. Burnett—I would move that the drawings or blue prints accompanying the reports of the committees form a part of the printed proceedings of this meeting by being placed in the book in lithographic, or some other form.

Seconded, and carried unanimously.

President Craig—Since we have been in Cleveland we have received many kindnesses at the hands of the people of this city, and I think it would be right and proper to pass a resolution of thanks for the entertainment we have received at their hands, and it would be in order if some member of the association would take the matter up and offer a resolution to that effect.

Mr. Caffrey—In accordance with your suggestion, Mr. President, I will offer this resolution:

Resolved, That the thanks of this association be tendered to Mr. Charles Latimer for his able address of welcome; to the manufacturers and citizens of Cleveland for their uniform courtesy and many acts of kindness; to the proprietors of the Kennard House; to the press reporters present at our meetings; the press of the city of Cleveland; the railway press; to the railways of this city which have conveyed us to and from the various manufactories and places of interest, and in particular to the companies which have kindly passed our members to and from this convention.

Seconded and carried unanimously.

President Craig—The next business in order will be a decision as to the next place of meeting, and that, I think, can be quickly decided. I will say since I have been president of the Roadmasters' Association I have ascertained from correspondence that Chicago and St. Louis are central points, more accessible and more convenient for the members of this association than any other points. In making these remarks I do not wish you to select any place for our next annual meeting unless it meets with your favor. We can go anywhere, and my vote would amount to but little, one way or the other. I simply mention those two points. You can name any other places you wish.

Mr. James Sloan—I move that we hold our next annual convention at Denver, Col.

Seconded.

Mr. Caffrey—I move that the next place of meeting of this association be at Chicago.

Seconded.

Mr. Perry—I suggest Baltimore.

Seconded.

Mr. Campbell—I would suggest Joliet.

Mr. Nolan—I think we should meet in Washington, D. C.

St. Louis, Mo., and Cairo, Ill. (laughter following), were also mentioned.

The first ballot resulted as follows; Chicago, 21; Washington, 22; DesMoines, 1; Denver, 6; Baltimore, 4; St. Louis, 1. Total, 55.

Mr. Burnett—As DesMoines and St. Louis have the two lowest votes, each having one vote, I move that they be stricken from the list to be voted on.

Carried.

Mr. Reed (secretary)—As Baltimore and Denver have so few votes I would suggest that they also be left out.

Mr. James Sloan—There is a roadmasters' association "Down East," in the Eastern States, and I do not think we should hold our meetings in that direction.

Mr. Perry—Washington, D. C., is not included in that territory.

Mr. Nolan—Washington, I think, is the most instructive point we could visit.

President Craig—I will state regarding Washington, if you wish to go there for instruction, I do not suppose there is a place in the United States where you could spend three days any more profitably if you were to travel the whole country over; at the same time, I would not vote for it. I shall vote to go where we will have the largest attendance. I tell you, gentlemen, to-night, the life of this association in future is going to depend upon the attendance. If we go to Washington and have 25 or 30 members present, you will find the roadmasters' association looking for a cemetery.

Mr. Cornell—I do not think any of us will go to Washington unless we get there by way of the roadmasters' convention; I do not think my constituents will send me there. [Laughter.]

Mr. John Sloan—I move as an amendment to Mr. Reed's motion that in taking our next ballot Baltimore be left out and Denver retained.

It was so voted.

The President—There are Washington, Chicago and Denver left to ballot on. You will proceed to another ballot.

The second ballot resulted as follows: Chicago, 22; Washington, 27, and Denver 6; total, 55.

On motion of Mr. Burnett Denver was stricken out and another ballot proceeded with.

The third ballot resulted as follows: Chicago, 27; Washington, D. C., 29; total, 56.

Therefore Washington, D. C., was selected as the next place for holding the annual convention.

Mr. John Sloan—I move that the time of the next meeting be the 11th of September, the second Tuesday.

Mr. Reed—The time of the annual meeting is fixed by the constitution. It says that the regular annual meeting of the association shall be held on the second Wednesday in September.

Mr. John Sloan—It was changed by vote last year, and it should be changed now only by vote. I move that the rules be suspended and that we hold our annual meeting on the second Tuesday in September.

Seconded.

Mr. Dickson—I think there are more members who can attend in October, and I hope the motion will not prevail.

Mr. Preston here took the chair.

Mr. Perry—If I can go in September, why I can return in time to finish my work. I do not see where the difference would be, only I think September would be the best; we would have time to do the work, and perhaps make some improv-

[illegible]
l in New York annually the second Tuesday in October. I have managed to attend each convention, it is very onable for both of us to be absent from the line at the ime. I wish to be with you, but I cannot be with you on th of October. I do not mention this to cause you to the time, but simply on my own account. [Cries of tion!" "Question!"]

ident Craig (resuming the chair)—All those in favor of g the second Tuesday in September of 1888 for the an-ieeting of this convention will please arise.

y-eight arose, and none arose in opposition. Carried nously.

ident Craig—The next matter for discussion will be the of the committee on the revision of the constitution and s.

secretary read the report of the committee.

ident Craig—You have heard the report of the commit- the revision of the constitution and by-laws. What is leasure?

James Sloan—I move it be referred to the executive com-, with power to act.

nded.

Cain—The executive committee cannot amend or change -laws?

Seconded.

Lost by a rising vote, only eight voting in the affirmative.

The President—Now the report as submitted by the committee is before the house for discussion as a whole.

Mr. Shea—After five or six members have examined this carefully, I move the whole be adopted, together with the by-laws.

Seconded.

Mr. Swinney—I requested the committee to insert five elective members of the executive committee, instead of three. The way the section reads now, the executive committee shall consist of five members, three to be elected, and the president and secretary, *ex-officio*, which would leave three a quorum of the committee. At Cincinnati at our meeting one member of the committee had resigned his place in the association, and one member had died, and there was a bare quorum. Now, why should this be allowed to occur again when it is very easy to add two more to the committee and be sure of having a good working attendance?

Mr. Reed—The constitution provides that "vacancies may be filled *pro tem.* by the president," and that was done in Cincinnati, I think.

Mr. Swinney—It ought to have been, but was not done. There is no necessity of having an executive committee if it is all in the hands of one man. I am not afraid of Mr. Craig or of any other president, but I do not like that part of it. The executive committee, as I understand it, is the balance-wheel of the management of the association, and I do not think the president and secretary should have the power of collecting all of our money and spending it without the consent of the other members of this committee. If the president has power to fill all of those positions, why if members are absent it places the whole power in his hands, and the executive committee might as well be abolished at once.

By request the secretary read the power of expending money by the executive committee under the old by-laws.

The President—It occurs to me that that gives the executive committee sufficient authority and control of the funds! I do not see that you can give them more!

. Swinney—That is not the point! The same thing would
again as at Cincinnati; there were three members there
d by the association—myself, Mr. Sloan, and Mr. Craig.
. Craig had the power to fill those other two vacancies,
ppoint two members, he could, if he were so inclined,
the control of the committee in his own hands, because
wo members he would appoint would not be elective mem-
y the association; that is the point I make.

. James Sloan—I move that all vacancies be filled by the
lent, by and with the consent of the executive committee.

. Burnett—Does that refer to the executive committee, or
the officers?

. James Sloan—To the executive committee, by and with
consent, with the president!

onded.

sident Craig—As I understand the remarks of the gentle-
a vacancy can only occur in an elective office. The mem-
f the executive committee will be elected by this associa-
The president is chairman *ex officio* of that committee.
having had one year's experience as president of this
iation, if it is necessary to make an appointment to replace
nember of the executive committee, I think, if this asso-
n cannot put a gentleman in that office in whom they can
e confidence, that we had better elect an executive com-
e, or a certain number of presidents to manage this asso-
n, and term them an executive committee, and do away
the presidency! Any gentleman whom this association
d select as their president, and who would prostitute his
rity by doing anything that was incompatible with the
ests of this association ought to be drummed out. [Sensa-
nd loud applause.] If we elect a president and he is not
sident, we want to get rid of him. If you put him in as
president do not hamper him. Select your man, and select
as your representative, with confidence in his course, in
onesty and integrity, and if you cannot find a man of that
iption in your association you had better disband to-night.
od!" and applause.] Gentlemen, please bear in mind that
this situation is by no means novel; our course in this con-
ion to-night does not differ from others. There are assem-

blies and associations all over this world where like powe given and confidence reposed. And now, gentlemen, d allow the action of the Roadmasters' Association of Am in convention assembled, to be of such a nature as to say t world "They are doubtful of their president!" [Loud plause.]

Mr. Swinney—I suppose that exception is taken to w said! I made the plain assertion that I did not doub president; I do not in the least. I have worked with him perfect cordiality. But I believe that I am upholding an that governs all societies, and I believe I am right in it. [of "Question!" "Question!"]

President Craig—In his remarks just made, the gentl refers to me as the president. We have been associated tog in the executive committee for a number of years. The cussion does not concern what has past and gone, but it is considered as a law to govern the future. I am not spea for myself. My office expires by limitation to-night, ther what I say is not for myself, but for the gentleman whom may select to occupy the chair. [Cries of "Question!"] tlemen, before we put the question, you will please con that there are some radical changes to be made in the cons tion you propose. It is proposed in one section that the o of secretary and treasurer be made one. I have had somet to do with that, myself, in consulting with the members o committee. My object in favoring that is this: You ha secretary, who receives all the money for dues, admission etc. You elect a treasurer, and the secretary pays that m over to the treasurer, and it costs money to send it to him, he simply deposits that money in bank, and when the secre needs it again, under our present constitution and by-law must apply to the treasurer to have it sent back again. bear in mind in adopting this report as a whole that we state whether the secretary shall be the secretary and treas or whether he shall be the secretary. It is necessary to do because we must have a treasurer, or a secretary and treas one of the two.

I will state that the constitution and by-laws governing association for previous years were defective, to the extent they did not provide for any dues from members of this association, and we have paid them into this association in confidence without any right or authority, and the collections have been made without any right or authority, further than the issuing of the circular authorized by the executive committee at the meeting held in Cincinnati. That is our law, and we must be governed by it. When we called on a member for his dues the question might be asked: Where is your authority for collecting dues? We can, under our proposed constitution and by-laws, collect annual dues to meet the expenses of the association, and that is one change over our constitution and by-laws for previous years. I mention this because I am perhaps more familiar with them than many of you and wish to call your attention to this section and for you to have it in mind as the most radical change made. This is to be known as the "Roadmasters' Association," and the roadmasters and supervisors may wish to join this association.

Mr. Reed—I will state that the exact title by which the roadmaster applies for admission—he is a roadmaster after all—is left blank in the application to suit just such cases as the one in question.

Mr. Preston took the chair.

President Craig—Well, the question is before the house. Articles 6 and 7 relate to the duties of the secretary and treasurer. I move that article 6 be amended to read "secretary and treasurer."

Motion seconded and carried.

President Craig—Therefore, in electing officers, we will elect a secretary and treasurer as one officer, instead of a secretary and a treasurer separately, as we formerly did.

On motion, the constitution and by-laws, as amended, were adopted.

President Craig—There are here now two applications for membership. The names are B. F. Bond, of the O. & M., and Z. W. Baker, of the Fall Brook Coal Company.

The above-named applicants, having complied with the rules of the association, were admitted to membership.

Mr. John Sloan—I move that the names of all the ladies attending this meeting, roadmasters' wives, be entered on the

minutes of this convention and appear as a part of t
ceedings.

Seconded, and carried unanimously, and the follow
was presented:

Mrs. Jas. Sloan,
Mrs. A. B. Adams,
Mrs. K. C. Benett,
Mrs. C. H. Cornell,
Miss Ida McEntaffer,
Mrs. A. J. Diddle,
Mrs. Thos. Dickson,
Mrs. F. X. Galarneau,
Miss M. Busteed,
Mrs. T. Hickey,
Mrs. Chas. Mellville,
Mrs. A. P. Blue,
Mrs. S. E. Sloan,
Mrs. D. B. Ruffner,
Mrs. H. D. H
Mrs. R. A. H
Mrs. S. L. Sw
Mrs. D. McE
Mrs. W. G. D
Mrs. I. Burne
Mrs. Geo. E.

President Craig (resuming the chair)—Now we come
last matter to act upon to-night; that is the election of
for 1888, and to do that we will commence at the botto
list and work up.

Mr. James Sloan's office expires by limitation at this
as also Mr. E. W. Mills'; we, therefore, have two me
the executive committee to elect—one for three years
for one year, one to elect for one year to fill Mr. Mills' va
and one for three years to fill the expired term of Mr. S

Mr. Preston placed in nomination Mr. Caffrey as a me
the executive committee for three years.

Mr. Burnett nominated Mr. George E. Cain for three

Mr. H. D. Hanover and Mr. James Sloan were also no
for three years.

A vote by ballot resulted as follows: Mr. Richard
27; Mr. James Sloan, 15; Mr. W. B. Stimpson, 1; Mr.
E. Cain, 2; and Mr. H. D. Hanover, 5—total 50.

President Craig—Mr. Richard Caffrey, of the Lehigh
Railroad, having received a majority of the ballots
therefore, duly elected a member of the executive co
for the term of three years.

The next member of the executive committee to be
will be for the term of one year.

Messrs. M. Shea, Martin Palmer, John A. Dodson,
Galarneau, P. Nolan, and C. H. Cornell were nominate
motion the nominations were closed, and the ballot res
follows: M. Shea, 9; Martin Palmer, 8; John A. Do

F. X. Galarneau, 3; P. Nolan, 5; and C. H. Cornell, 16—total, 47.

Mr. Swinney—I would move to reconsider the vote by which we adopted our constitution and by laws, so that I, or some other member, can move the amendment of adding the two vice-presidents to the executive committee, making it consist of seven members. That was what I was getting at, and the chair, I think, concurred with me; and all, I think, will see that it is better.

Seconded.

President Craig—I will explain Mr. Swinney's object in that amendment. It is sometimes a difficult matter to get a quorum of this committee, but by adding the two-vice presidents it is made very much easier.

The motion was put, and carried unanimously.

It was moved and seconded, and voted unanimously, that the candidate for member of the executive committee having the largest number of votes on the last ballot be declared elected.

Mr. Cornell—How much will that be? [Laughter and cheers.]

President Craig—Mr. C. H. Cornell, of the C., M. & St. P. R. R., is, therefore, elected a member of the executive committee for a term of one year. I must congratulate you, Mr. Cornell; you will get to Washington ahead of the convention. [Laughter.]

The next office for which we will make nominations will be for secretary and treasurer—in one office. Name your candidates.

Mr. James Sloan—I would nominate Mr. Reed, the present acting secretary, as secretary and treasurer.

Seconded by many.

Mr. H. W. Reed—S., F. & W. R'y—I feel very grateful to the gentlemen who have nominated me for the office of secretary and treasurer, and I would be very glad to serve the association in that capacity if I had the time, but I am very busy and really do not have the time to spare that should be devoted to it, and I therefore earnestly request that the members will reconsider their nomination and allow other nominations to be made, and I will respectfully withdraw my name for that pu pose. [Voices, "You cannot withdraw it," "It won't do," etc.

Mr. James Sloan—I think Mr. Reed has as much time as an of us. [Cries of "Question!" "Question!"]

On motion, Mr. H. W. Reed, of the S., F. & W. R'y, wa unanimously elected secretary and treasurer by a standing vot

President Craig—The next officer to be elected will be secon vice-president.

Messrs. James Sloan, George E. Cain and Isaac Burnett, wer nominated, and all seconded. It was voted that the gentlema having the highest number of votes be declared elected. Th ballot resulted as follows:

Mr. James Sloan, 35; Mr. George E. Cain, 9, and Mr. Isaa Burnett, 6; total, 50.

President Craig—Mr. James Sloan is, therefore, declared th second vice-president for the ensuing year. The next thing i order is the election of a first vice-president, and nomination are in order.

The following were nominated: Messrs. George E. Cain, J H. Preston and Isaac Burnett. It was voted that the candidate receiving the highest number of votes be declared elected The vote resulted as follows:

Mr. Isaac Burnett, 23; Mr. George E. Cain, 22, and Mr. J. H Preston, 9; total, 54.

There having a doubt arisen as to whether Mr. Burnett' name had not been counted twice by the tellers by mistake, new ballot was ordered, which resulted as follows:

Mr. Isaac Burnett, 29; Mr. George E. Cain, 26; total, 55.

Mr. Burnett was, therefore, declared elected first vice-president. [Applause].

Mr. Isaac Burnett—Gentlemen, I have served the associatio a long time, and you ought not to have done it, and inasmuch too, as I am not a regular railroad employe, but you may res assured that what little I can do for the association I will do [Applause].

President Craig—We are nearly through.

Mr. Richard Caffrey nominated Mr. J. W. Craig as president and moved that the secretary be instructed to cast the one ballot of the convention for him.

(Mr. Preston took the chair.)

President Craig—As my name has been mentioned for the esidency for the ensuing year, I beg the gentleman who so indly nominated me to withdraw the nomination. I do so for his reason: The association is in a vigorous condition; there are a large number of members, and you should keep the position of president in rotation.

I met with you in Indianapolis first in 1884, and you have conferred the honor on me of electing me to office each year since I have been a member of your association. Therefore "honors are easy." The association is now on a fair and secure road to prosperity, there is no reason why, with proper management, it should not be a success in every particular. This association contains members of ambition and life, and there is no necessity of having one man direct your affairs from year to year. Let us change this thing about; do not give it all to one man. There are others here, men of vigor and ability, who should have it.

Another thing, the position of president of the Roadmasters' Association is no *sinecure*. The gentlemen elected to that office heretofore will tell you something about it. I therefore beg the gentlemen who have nominated me to withdraw it. I will say, elect whom you will, I will do all in my power to aid him and you. I came into this association to do all possible in my power, to work for it and aid it in every way, and this I have endeavored to do during my membership. Then elect whom you will, he will have my support toward keeping this association as it is to-day. This association has reached that position where it is becoming the recognized authority in railroad circles of the department you represent. The proceedings of this association are looked forward to with a great deal of interest, not alone by railroad managers, but by the railroad press and the press of the country at large. We are the representatives of the maintenance of way; we carry with us a great responsibility, much more than has ever been known or recognized before the organization of this association. Our proceedings are read by people who knew nothing of the work of a roadmaster and the maintenance of way before the organization of this association; your services are becoming further appreciated day by day; you have come before the world as the "Roadmasters' Association of America," and you are now showing them, by the course pursued in this convention, in the discussion and disposition of these subjects, what your duties are, and what your opinions are as you apply them to practical use. Gentlemen, you can reflect to-night that you, as railroad men, by your organization and your meeting in convention, and the varied subjects that you are discussing, you are brought before the world to-day in a more important and dignified light than you have ever been before. [Loud applause].

Mr. Burnett—Mr. President, while I am well aware of the fact, as our president states, that the arduous duties of the man elected president of this association can better be told at the end of 1888 than now, I would move that Mr. Craig's request that he be allowed to withdraw his name and not again be elected president of this association be unanimously declined.

Seconded by many.

Mr. Caffrey—I move the previous question. There is only one nomination before the convention, as I understand it.

Mr. Swinney—There are two.

Mr. Caffrey—The nominations were closed, as I understood it.

Mr. James Sloan—I nominated Mr. Jones before they were closed.

Mr. Ramsey—The nominations were closed immediately on Mr. Caffrey's motion.

President Craig—Allow me to say one word on this subject. The presidency of this association is no office to garble for, and I must respectfully decline to run, or allow my name to stand as a candidate for the position, and, really, I do not think this association should ever elect a president except with perfect unanimity and harmony and an entire willingness to cast the ballot of the association for him.

Mr. Burnett—There is a motion before the house, seconded by everybody, that we unanimously refuse to accept the declination.

Mr. James Sloan—I withdraw my nominee.

The question was put to refuse to accept Mr. Craig's declina- [illegible] carried unanimously.

[illegible]—I move that the secretary cast the one ballot

se]. I thought I had a nice thing, and I continued to think
ntil the month of August, as up to that time the business of
association had not bothered me, and I thought I had a
easy berth. In the month of August the business of the
ciation began and continued until the 1st of October.

r. Burnett—And is not quite through with yet. [Laughter].

esident Craig—It continued up to the present moment. The
es of the president were greatly increased owing to the
tment of the "interstate commerce law." That law pro-
s that no free transportation shall be granted only on the
est of an official of one road upon that of another, and to
oad employes. That you will find in section 22 of the act.
wing that our convention was to meet here in Cleveland on
he 11th of October, it was then incumbent upon me to ar-
e for the free transportation of the members of this associa-
who desired to attend. I took up the matter by sending
250 circular letters to railway managers in the United States
esting that the certificates of this association, signed by the
ident and secretary, be honored in lieu of a pass for mem-
of this association to attend our fifth annual meeting at
eland. Well, the replies commenced coming in early in
ust, about the 12th, and they kept on coming in until about
st of October. Well, I got along nicely until I reached the
rbs of Cleveland. The roads leading into Cleveland would

Now, in electing me your president for the ensuing yea second term, allow me to return to you my sincere and he thanks for the honor you have conferred upon me. Often we look for those things which we expect and which we think we deserve, and they come not; but seldom, indee we surprised by having bestowed upon us what we ha right to expect, and in this instance you command my d gratitude.

I have endeavored through life to discharge my duty now to be elected your president for a second term giv the comforting assurance that I have at least impresse with the conviction that I have endeavored to perform my as best I knew how.

I know you have much before you which claims your tion, and I shall not longer trespass on your time. As you that I shall do my utmost to deserve your good opin again return you my sincere thanks.

I wish you all a pleasant and safe return home, hopi meet every one of you in Washington next year at the tin pointed for our annual meeting, and when you assem Washington I think you will all say you have seen more t novel and instructive, than ever before in any city, an certainly will if you visit the Smithsonian Institute a.

ling the two offices be raised to $75 per annum instead of $50, as now.

Seconded.

A voice—"Make it a hundred!"

Seconded by several.

President Craig—It is moved that the salary of the secretary and treasurer be increased from $50 to $100 per annum for the duties performed by him.

Motion put and carried unanimously.

Adjourned to meet in Washington, D. C., the second Tuesday in September, 1888.

Constitution and By-Laws.

CONSTITUTION.

Article No. 1. The name of this organization shall be the Roadmasters' Association of America.

Article No. 2. The officers of this association shall be a president, first vice-president, second vice-president, secretary and treasurer, and the executive committee, consisting of seven members, including the president, vice-presidents and secretary and treasurer ex-officio. The president shall be chairman of the executive committee.

Article No 3. The officers shall be elected by ballot, and a majority of all the votes cast will be required to elect. No officer will be elected for more than three consecutive terms of one year each, except members of the executive committee. They shall be elected one for one year, one for two years, and one for three years. At the regular annual meetings hereafter one member shall be elected for three years.

Article No. 4. The president, or, in his absence, one of the vice presidents, in order of election, shall preside at all meetings. In case of absence of both president and vice presidents, the members may elect a president pro tem.

Article No. 5. The offices of secretary and treasurer shall be invested in one member.

Article No. 6. The secretary and treasurer shall keep the records of the association and of the executive committee. He shall conduct all correspondence, issue notices of the association and the executive committee; shall collect all fees and dues and keep the accounts and be charged with all the funds of the association and disburse them under the direction of the executive committee. He shall attend the annual meetings, or at any other time if required by the executive committee, furnish a statement of the fees or income and expenditures of the association.

ARTICLE No. 7. All bills against the association must be approved by the chairman of the executive committee before they shall be paid.

ARTICLE No. 8. The executive committee shall have the general management of the association. Five members of this committee shall constitute a quorum at any regular or call meeting of the committee.

ARTICLE No. 9. Vacancies may be filled pro tem. by the president.

ARTICLE No. 10. Regular annual meetings of the association shall be held on the second Wednesday in September. Special meetings of the association or the executive committee may be called by the president if in his judgment it is for the interest of the association to do so. Ten members of the association shall be a quorum at any regular or call meeting of the association.

ARTICLE No. 11. At each annual meeting the place for holding the next regular meeting shall be selected by a majority of the members present.

ARTICLE No. 12. To become a member of this association all applications must be made upon the prescribed form (appendix No. 1), which must be accompanied by the entrance fee of $2.50; must have the endorsement of two members, and must be approved by the executive committee.

ARTICLE No. 13. After the approval of an application for membership by the executive committee, the secretary shall so notify the applicant, and his name shall be proposed for election at the following regular meeting. Five negative votes shall exclude an applicant from membership.

ARTICLE No. 14. After election of an applicant by the association the president and secretary shall issue to him a membership certificate.

ARTICLE No. 15. The membership of any person shall begin at the day of his election.

ARTICLE No. 16. The regular annual dues to the association shall be $1.00, payable on the first day of January.

ARTICLE No. 17. Any member failing or refusing to pay his annual dues before the annual meeting of the year for which said dues are applicable, shall not be entitled to a vote at said regular meeting nor thereafter until all dues in arrears are paid.

ply with such notice of assessment, and
will subject them to the same forfeiture o
bership as prescribed in articles Nos. 17 a

ARTICLE No. 20. Any member may be e
ciation by a two-thirds vote of the member
lar meeting.

ARTICLE No. 21. Special committees ma
time by the president.

ARTICLE No. 22. This constitution may b
at any regular meeting of the association
two-thirds of all members present.

BY-LAWS.

SECTION No. 1. At regular meetings t
unless set aside by the votes of a majority
sent, shall be as follows:

1. Opening exercises.
2. Reading minutes of last regular and a
ings.
3. Enrollment of new members.
4. Reading communications.
5. Unfinished business.
6. Reports of committees and discussion

Sec. No. 3. Members must promptly notify the secretary of any change in their position or address.

Sec. No. 4. These by-laws may be revised or amended at any regular meeting by a majority vote of those present.

APPENDIX NO. 1.

ROADMASTERS' ASSOCIATION OF AMERICA.

MEMBERSHIP APPLICATION.

.... 188...

To the President and Members:

Gentlemen—I am employed as .... in charge of............miles of track on the.............................. ....Railroad........................Division. Residence ....State of........................, and hereby make application for membership in your association. If elected I will endeavor to faithfully discharge all duties imposed upon me by the association, and will comply with the constitution, by-laws, and all rules of the association.

Respectfully,

....

....

We hereby certify that Mr. ...., who hereby applies for membership in the Roadmasters' Association of America, is a man of good moral charactor, and is.................. ....in actual charge of................miles of track on the..Railroad, with headquarters at..

Members of the association { ....
....

Note.—This application must be made out and forwarded to the secretary with $2.50 for entrance fee. Remit by draft or post office order.

INDEX

PAGE
.... 2
Speech of Chas Latimer .... 3 to 12
.... 12 to 20
Rail for Frogs (Illustration) .... 24 and 50
Frogs .... 24 and 61
Rails for Bridges, etc. (Illustration .... 25 and 73
Joints .... 25 and 87
ard Rail Illustrations .... 25 to 49
Cars .... [illegible]
ttee on Deaths 100
.... 101
By-Laws 120

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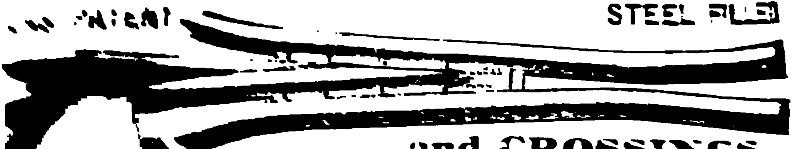

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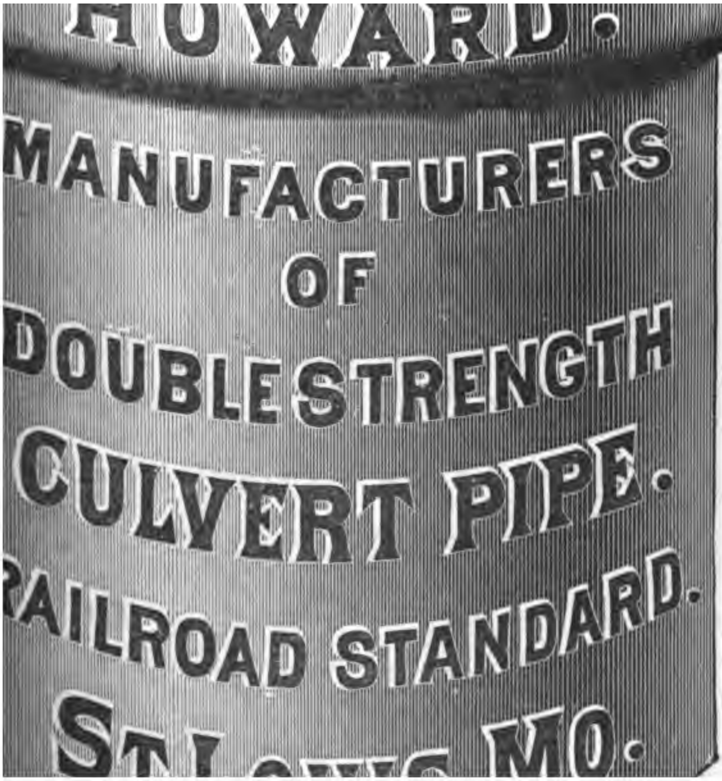
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Rails—Joints—Chairs—Splices—Broken Angle Bars—Bolts—Nu locks—Spikes—Braces.

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CHAPTER V.

Fences—Cattle Guards—Road Crossings—Signs—Bridge Tell-Tale—Bumping Blocks—Mail Crane—Tool House—Watchman's Cabi —Shanty.

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8. Curvature.
9. Rise and Fall.
10. The Relative Importance of Gradients.
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12. Rolling Stock.
13. Train Resistance.
14. The Effect of Grades on Train-Load.
15. The Effect of Train-Load on Operating Expenses.
16. Assistant Engines.
17. The Balance of Grades for Unequal Traffic.
18. Limiting Curvature and Compensation therefor.
19. The Limit of Maximum Curvature.
20. The Choice of Gradients and Devices for Reducing them.
21. Trunk Lines and Branch Lines.
22. Light Rails and Light Railways.
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26. Terminals.
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respond practically to those of our sectional
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and "New Projects and Surveys." Under t
cluded all construction, surveys and schemes
the work on new lines for which bona fide co
Under "New Projects and Surveys" is given
and projected lines whose construction has not
are independent of existing companies.

We call special attention to the CORRECT
*news. What we report as facts may be relie
current rumors of importance are given, they
comments concerning their probability or the
wide sources of information and intimate a
railroad situation generally enable us to judg*

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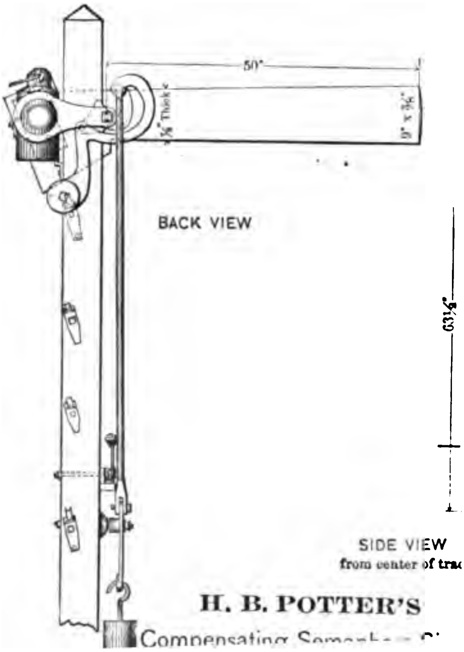

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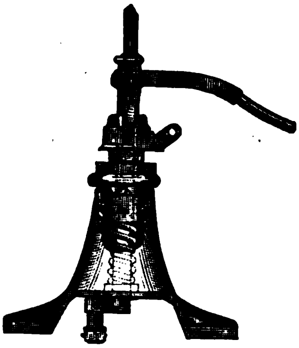
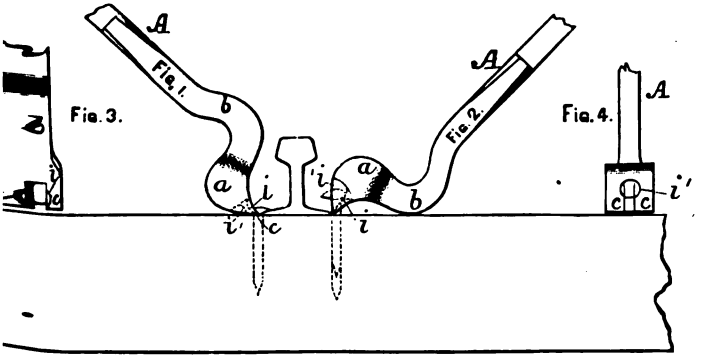


HAMM'S SPIKE PULLER.



AMAPO IRON WORKS,

Hillburn, Rockland County, New York.

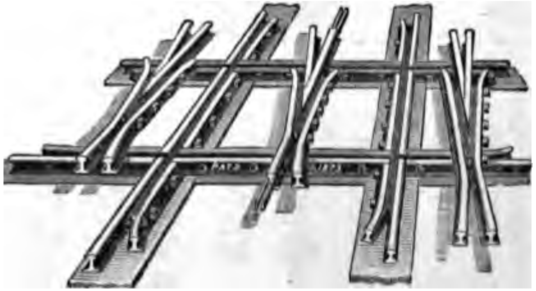
ELLIOT FROG AND SWITCH CO.

—MANUFACTURERS OF—

RAILROAD FROGS AND CROSSINGS,

Any Weight or Section of Rail Desired--or any Angle.

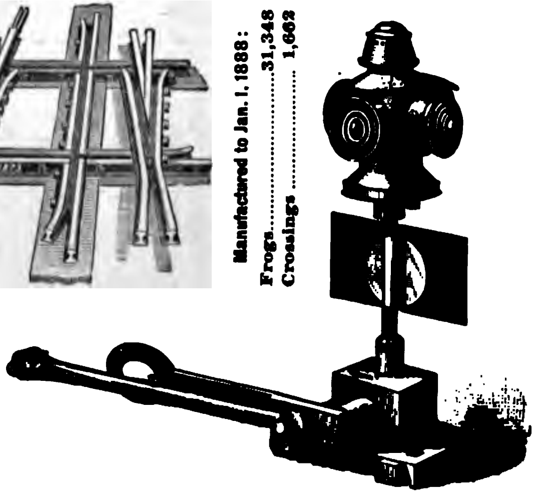
☞Our Stiff Rail Frogs and Crossings are made with SOLID WROUGHT-IRON FRAMES.



Manufactured to Jan. 1, 1888:

Frogs.............................**31,348**

Crossings **1,662**



Spring Rail Frogs, Switch Stands and Switches

OF VARIOUS KINDS, TO WIT:

Split, Lapp and Stub, with Rods, Slide Plates and Head Chairs; Rail Braces, Wrecking Frogs, and General Railroad Iron Work. Our large capacity for this line of work enables us to fill orders promptly.

☞Estimates and other information furnished on application.

Address, EAST ST LOUIS, ILL

.LIOT'S MAIN LINE RIGHT AND LEFT

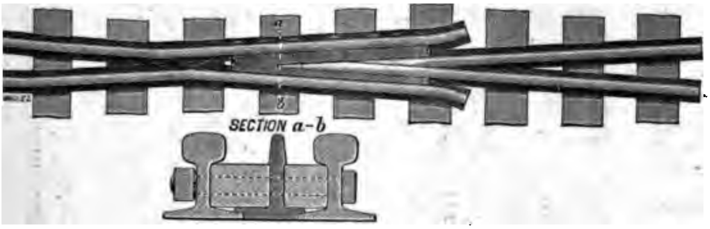
STIFF RAIL FROGS.

ual in Life with None of the Objections of

SPRING RAIL FROGS.

hese Frogs are constructed with a Wrought Iron filling frame, and shrunk on point while hot; the frame is then planed to the ect angle and to fit the outside rails. They are bolted strongly ther (transversely) with seven ⅞-inch bolts of charcoal iron. structed in this manner they retain, as near as practicable, the e elasticity as the rail.

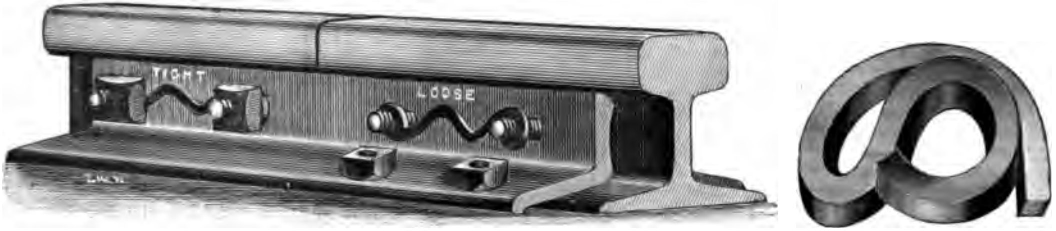
RIGHT HAND FROG.



he novel feature of these Frogs is, that they are made with a e flange opening 2 to 2¼ inches for the main line, and a narrow ning, 1½ inches, for the side track. This opening, 1½ inches, is le when a train is running slow on entering or leaving a side k, but is not sufficient opening for the main line, where trains e to run the Frogs at high speed. With a Frog angle one inch e, with a 1½-inch opening to the side track, you have virtually a tinuous main line, and we expect these Frogs to give about the e service as a Spring Rail Frog, for the reason that an ordinary el will have a continuous bearing surface equal to the width of rail. The great difference claimed between the life of a Spring l Frog and Stiff Frog, we apprehend, has mostly occurred where openings have been very wide, as few trackmen are satisfied h less than 2-inch opening on main line.

e make these Frogs Right and Left, as has been the case in ing Rail Frogs. We make them any length required, but we ider (economically and otherwise) 12 feet the best length, and is standard length for this class of Frog.

ELLIOT FROG AND SWITCH CO.,
EAST ST. LOUIS, ILL.



THE ◆ EXCELSIOR ◆

Automatic Nut Locks

—AND—

FISH PLATE SPRINGS.

◆—The Cheapest, Most Durable, and Effective Nut Locks Known.—◆

☞ Sample lots furnished for trial, Free of Expense, by forwarding the distance between Centres of of Fish Plate Bolts. ☞ Correspondence and Orders solicited. ☜

Adopted by the New England Roadmasters in Convention, held at Hartford, Conn., October 19th and 20th, 1887, as the BEST Nut Locks known in use.

RUFFNER, DUNN & CO.,
Patentees and Sole Manufacturers,
SCHUYLKILL FALLS, PHILADELPHIA, PA.

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lley R. R. Co., Mr. H. Stanley Goodwin, General Superintendent, Beth-
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d Maine R. R. Co., Mr. James T. Furber, Gen'l Manager, Boston, Mass.;
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, New Haven and Hartford R. R. Co., Mr. O. M. Shepperd, General Su-
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d Albany R. R. Co., Mr. W. H. Russell, Chief Engineer, Springfield, Mass.
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ass.
ett Pier R. R. Co., Mr. George T. Lanphear, General Superintendent,
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k R. R. Co., Mr. George W. Beach, Superintendent, Waterbury, Conn.
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oss, Ga.

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KALAMAZOO, MICH.

Manufacturers of Combination Paper and Wood Whee
Cars, Push Cars, Iron Rail Cars, Bridge Gang
Roadmasters' Inspection Hand Cars, Inspectio
Velocipedes, Steel Velocipedes, Mail Cars,
and a General Line of Specialties.

"KALAMAZOO PAT. COMBINATION" "PAPER & WOOD WHEEL CAR"

Weight 500 Lbs.

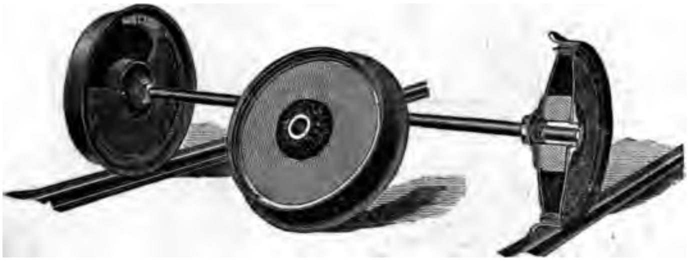
Over 2,000 of the above cars now in use. Particular attention given ord
Special Cars. Send for 1888 Catalogue and Descriptive Circular

KALAMAZOO R. R. VELOCIPEDE & CAR COMP

COMBINATION PAPER AND WOOD

HAND CAR WHEEL.

Now Made with 1·32 Inch Steel Plates on Outside of Discs.



One of the most important features in the manufacture of Hand Cars is the Wheel. Improvement in this direction has long been neglected, and through the urgent demands of Railroad Systems in this and foreign countries for a *lighter, stronger and a more durable Wheel*, we were led to experiment at a considerable expense for the past two years. We feel that we have been amply rewarded for all time and expense, in now being able to offer a far superior Hand Car Wheel to any yet invented. While the several wooden wheels in use the past few years were considered an improvement over the ordinary cast and wrought iron wheels, railroad people *still continued* to find fault, and complain that they *were not durable;* that they would not stand an exposure of all kinds of climate and weather; that the bolts worked loose; that the wood would shrink and swell, and finally check, split and become useless. We herewith give a brief description of the construction of our wheel, and are willing to test it in competition with any Car Wheel of *even double its weight* yet produced.

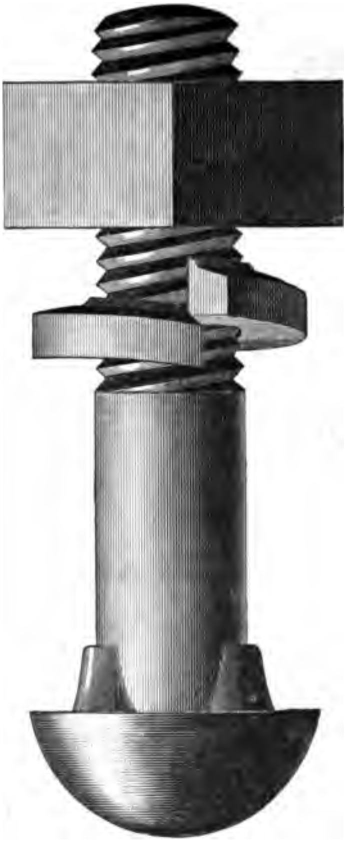
CONSTRUCTION OF WHEEL.

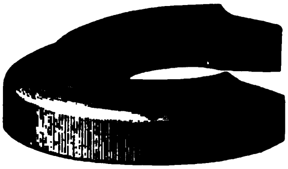
The rim is wrought steel, 20 in. in diameter, 4⅜ in. wide (before it is flanged) by 3-16 thick. The flange is turned in dies under a 2400-lb. drop, which makes them perfectly round and uniform.. The surface of the tread is ground on an emery machine and made perfectly smooth. The center is constructed of *paper* and wood in the following manner: Two discs are used for each wheel, ⅜ in. thick; ⅛ in. is of birch veneer and ¼ in. of compressed tar board or paper, ⅛ on each side of the veneer. The paper is treated with a material that makes it absolutely water proof and impervious. The two paper and one wood discs are put under 100 *ton pressure when hot*, the wood being saturated with glue and the paper with the waterproofing. After remaining in the press until entirely dry it is taken out and the discs are perfectly formed in concave shape and ready to be pressed into the steel rim, which has malleable iron angle stop riveted to outer edge of the rim, with ring on opposite side and bolted securely to angle stop through felly and discs. Between the two discs is a solid hard wood center 6 in. in diameter by 2⅜ in. thick and 1⅛ in. by 1 in. bent felly, which forms a backing at the point of bearing. This leaves a circular air chamber, 6 in. from wood center to felly, which makes the Wheel very light and nearly noiseless when in motion. It is perfectly waterproof, and will not be affected by climatic changes. It has been thoroughly tested under our immediate supervision and has given entire satisfaction under *very severe tests*—tests that were more severe than Hand Cars are rarely ever subjected to in actual track service. We feel confident that the Wheel will outwear any yet put upon the market, and will last, with fair usage, from five to ten years. *We guarantee Wheels in every particular, and will make good any and all repairs caused by breakage, imperfect material, or poor workmanship for three years from date of shipment.*

KALAMAZOO R. R. VELOCIPEDE & CAR CO.

THE

NATIONAL
LOCK ◆ WASHER.





SIMPLE, EASILY APPLIED.

Combining Strongest Spring Fastening possible, with positive locking of Nut by *rib*.

Can be used on any make of bolt or nut, in any place in track.

Same bolt, nut and washer can be used as *often as required*.

The National Lock Washer is made of steel, hardened and tempered in oil; when in use in track the rib is imbedded in nut (does not cut out metal in nut), thereby upsetting metal of nut and forcing it around bolt, and so locking nut that it cannot jar loose, acting at same time it has all the spring-holding power of best spring nut lock made.

A trial of the National Lock Washer is requested, as actual use will demonstrate its superiority. Samples furnished free of expense.

THE ◆ NATIONAL ◆ LOCK ◆ WASHER ◆ CO
52 LAWRENCE STREET,
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MANUFACTURERS OF
SECTION HAND CARS, SECTION PUSH CARS, THREE-WHEELED VELOCIPEDES,
STAND PIPES, AND OTHER RAILWAY SPECIALTIES.
THREE RIVERS, MICH. Catalogues sent on application.

PENNSYLVANIA
STEEL COMPANY

MANUFACTURERS OF
ALL WEIGHTS AND PATTERNS OF

STEEL + RAILS,

STEEL SPLICES, FORGINGS,

STEEL MERCHANT BARS, BLOOMS, &c., &c., &c.

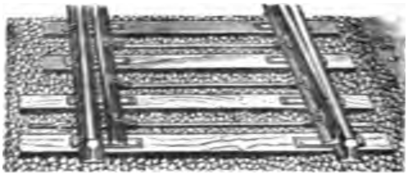
STEEL RAIL FROGS.
Copyright 1885.

Largest Manufacturers of Frogs, Switches, &c., in the country, with many advantages in favor of purchasers.

FROGS + AND + CROSSINGS

The special improvements in Frogs introduced and made solely by this Company, are used and approved as standards on many of the most important railroads all over the country, and give always the best possible service.

All standard patterns made as required.



IMPROVED
SWITCHES
OF VARIOUS PATTERNS,
For all Conditions of Service

SWITCH STANDS and FIXTURES

A large variety of Excellent Improved Patterns.

MAGNETO ELECTRIC ALARM SIGNALS,

For Highway Crossings and Stations. Automatically sounds an Alarm wh. train is at any required distance. Has no Cup Batteries and requires no material for maintenance except Lubrication.

ELECTRICALLY OPERATED SEMAPHORE SIGNAL

Worked at any desired distance with absolute certainty.

Financial Office: 208 So. 4th St., PHILA.	Works at Steelton, Pa.	New York Office No. 2 Wall St.

ROADMASTERS not supplied with descriptions of our Improvements will please send their address to G. W. PARSONS, STEELTON, PA.

THE ANTI-MAGNETIC SHIELD FOR WATCHES.

The Shield can be Fitted to any Case.—No Railroad Man should buy a Watch without the Shield.—Sure Protection from all Electrical and Magnetic Disturbances.—Send for Descriptive Circular.

GILES, BRO. & CO.,
99 and 101 State Street, Chicago.

THE E. S. GREELEY & CO.,

—SUCCESSORS TO—

L. G. TILLOTSON & CO.,

—MANUFACTURERS—

Railway and Telegraph Machinery and Supplies,

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TRACK TOOLS AND MATERIALS.

SOLE NEW YORK AGENTS FOR

VERONA TOOL WORKS, Manufacturers of SOLID Cast Steel Tools and Nut Locks.

"E. S. GREELEY & CO'S" Solid Cast Steel Spades, Shovels and Scoops.

VELOCIPEDE, HAND AND SECTION CARS AND RAIL BENDERS.

Dealers in Rails and Fastenings, Spikes, Adzes, Axes, all Miscellaneous Supplies and Signal Appliances.

E. S. GREELEY, President and Treasurer.

SEND FOR PAMPHLET
"SOMETHING ABOUT CULVERT PIPE"
BLACKMER & POST.
DOUBLE STRENGTH
CULVERT
PIPE
WITH
IMPROVED SOCKETS
AND IN 2½ FOOT LENGTHS
MADE ONLY BY
BLACKMER & POST.
ST. LOUIS

IE WEIR FROG CO.

Manufacturers of the Most Complete Line of

TRACK SUPPLIES,

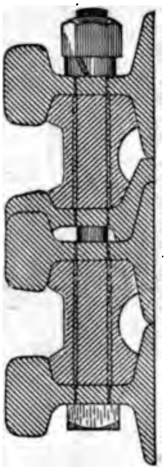
and have the largest capacity of any similar concern West of the Alleghany Mountains.

WORKS: Front, Smith and Water Streets,
CINCINNATI, O.

In the list of their manufactures may be mentioned Six Styles of Rigid Frogs, Two Styles of Spring Frogs, the well-known Clarke-Jeffery Split Switch with F. C. Weir's Improvements, Crossings, &c., illustrations of a few of which are shown herewith.

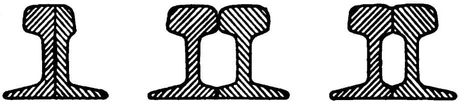
First, we desire to call the attention of the Roadmasters to our Rigid Frog, which is shown in cut, and Cross Section, cuts 1 and 2, Cross Section of which shows our Specially Rolled Solid Steel, or Wrought Iron Filling process. These Frogs are secured with ⅞ Through Bolts, the Widest National Lock Washer Company's Nut Lock, and Hex Nuts, making a very strong and durable job.

There having been some discussion as to the merits of the different methods of constructing points of frogs, we have concluded to show them all up, believing there will be but one conclusion by the level-headed, practical trackmen.



No. 2.

Cut Cross Section No. 3 shows original method of making points of frogs by notching the main point rail to receive short point rail.



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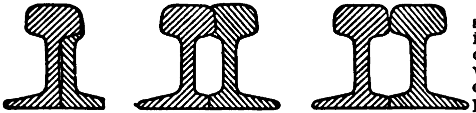
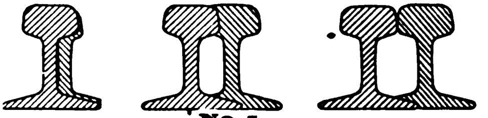


No. 4.

Cut No. 4 shows the first improvement on this, by which the head of the main point rail was preserved but the base weakened. Cut No. 5 shows the full strength of the main point rail preserved, but at

. I.

of very materially ing the short point that it has a very rtical support. Cut ıows the last iment, which is the system, manufacnd controlled exclusıy us. This is what n our Die Formed Short Point. By this method we not only save the ɪngth of the main point rail, but more of the original strength of the oint rail, and produce a stronger construction of the point rails generally. se cross section cuts are fair illustrations photographed down from fullrawings, therefore they can be unhesitatingly accepted as correct.



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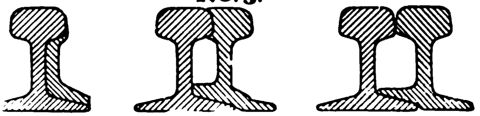

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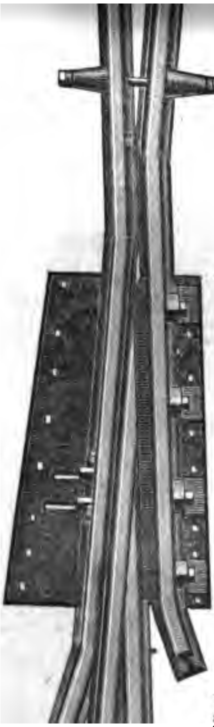

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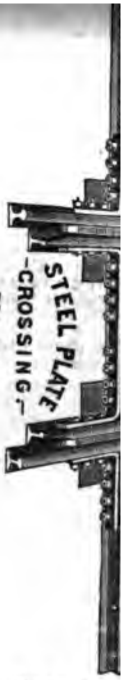


STEEL PLATE
-CROSSING-
No. 9

Our Crossings, made with
Wrought Iron or Steel Filling,
and Cross Section No. 10, are
These Crossings are secured wi
heavy Wrought Iron Bars whic

PROCEEDINGS

OF THE

SIXTH ANNUAL CONVENTION

OF THE

Roadmasters' Association

OF

AMERICA,

HELD AT THE

Metropolitan Hotel, Washington, D. C.,

SEPTEMBER 11, 12 and 13, 1888.

[illegible]

SAVANNAH, GA.:
THE MORNING NEWS PRINT.
1889.

No. 12.

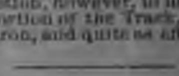
No. 15.

with Split Switches, when trailing through them. We have furnished large numbers of these with excellent satisfaction.

No. 16.

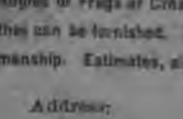
No. 17.

Cuts Nos. 16 and 17 illustrate our Open Hearth Steel Plate Head Chairs. These are so well known that it is hardly necessary to make any remarks as to their merits, but it may not be generally understood that because of using Steel Plates we are enabled to preserve the Elasticity of the Switch Joint, and thereby prolong the life of the Switch rails as well as furnish a Head Chair that will outlast any other in the market. We are furnishing these in large numbers which alone is sufficient as to their merits.



No. 18.

is the Wrought Iron Rail Brace made by this Company and gotten up to supersede the old style of cast iron ones that are equally clumsy, yet are easily broken in spiking and from other causes. These are indestructible either by spiking or any other way, and as they only weigh 7 pounds, where the old ones weighed from 15 to 25 pounds, they are fast doing what they are designed for, running the cast iron out. Several of the leading lines are now ordering them by the thousands. We have recently designed and patented an improvement on the above Brace, which is shown by cut 19. This Brace will be made of Steel. It is gotten up especially for bridges, to insure having a light strong Brace. There is no objection, however, to using it for any bracing purpose for any portion of the Track, as it is equally as durable as wrought iron, and quite as efficient.



No. 19.

In making orders for Frogs, Switches, Crossings, or Head Chairs, the Section of Rail should be furnished, giving Height and Weight, Distance of Fish Plate Holes, Gauge of Track, and Angles of Frogs or Crossings. Blue Prints are requested for any or all of this work whenever they can be furnished. Promptness is guaranteed in filling all orders, as well as good workmanship. Estimates, also Lithographs and Photographs, furnished on application.

Address:

THE WEIR FROG COMPANY,

Front, Smith and Water Sts.,

CINCINNATI, O.

PROCEEDINGS

OF THE

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OF THE

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OF

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SAVANNAH, GA.:
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PENNSYLVANIA STEEL CO.,

MANUFACTURERS OF

STEEL RAILS

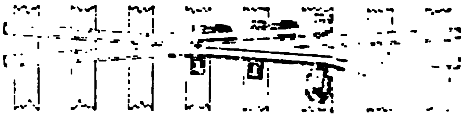
BLOOMS, BARS and FORGINGS,

OF BESSEMER OR OPEN HEARTH STEEL, FOR ALL PURPOSES.

STEEL PRODUCING CAPACITY, 350,000 TONS PER YEAR.

STEEL SPLICES, Angle or Plain, to fit Rails of All Sizes.

FROGS AND CROSSINGS,



Of various Improved Patterns, or to Specifications, as ordered.

The special improvements in Frogs introduced and made solely by this Company, are used and approved as standards on many of the most important railroads all over the country, and give always the best possible service.

SPLIT-:-SWITCHES and LORENZ SAFETY-:-SWITCHES,

OF IMPROVED PATTERNS,

controlled by this Company, and extensively used; also of special patterns in accordance with specifications furnished by roads.

SWITCH STANDS OF IMPROVED PATTERNS,

STUB SWITCH FIXTURES, TIE-BARS, &c.

MAGNETO-ELECTRIC SIGNALS FOR HIGHWAY CROSSINGS.

ALARM SOUNDS AUTOMATICALLY ON THE APPROACH OF EVERY TRAIN.

Safety of the public secured *at all hours*, for only a fraction of the expense of day watchmen. Electricity is generated by Magneto Apparatus which is substantial and reliable, acting only by passage of trains or locomotives, and until crossing is reached. Easily managed, and requires no material but oil for lubrication.

SEMAPHORE SIGNALS, OPERATED AT ANY DISTANCE,

by electricity, with absolute certainty and precision. Uses full-sized out-door Semaphore arms mounted on posts of usual form, say 20 feet high. Useful at Stations. The same are used also in

Magneto-Electric Automatic Block Signal System,

of great simplicity and efficiency, at moderate cost.

WORKS AT STEELTON, PENNSYLVANIA.

☞See Advertisement on pages 152 and 153.

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OFFICIAL STENOGRAPHER.

E. B. GROVER, Cleveland, Ohio.

INDEX TO SUBJECTS.

PAGE
TRACK JOINTS—Illustration........ 26
Reports Majority and Minority........ 25- 26
Recommitted to Same Committee. Members Requested to Co-operate........ 70
SNOW PLOWS—3 Illustrations........ 72
Report Adopted........ 72- 73
CROSS-TIES—Specifications of, etc. Report Adopted........ 73- 74
HAND CARS—Report Referred to Master Car Builders' Association, with Request to Furnish Plans and Specifications........ 90
FROGS—Letter President Superintendents' Ass'n........ 91
Members Requested to Consider the Matter Before Next Meeting........ 96
LABOR ON TRACK—Report........ 101
Recommitted to Same Committee and Members Requested to Co-operate........ 114
DEATH OF MR. CHAS. LATIMER—Report........ 114

NEXT ANNUAL CONVENTION.

Denver, Sept. 10th, 1889.

INDEX TO ADVERTISEMENTS.

Switches, Frogs, Crossings, &c.— **PAGES**
- The Weir Frog Co........................**155-156-157-158 and 3d page cover**
- Pennsylvania Steel Co........................**2d page cover and 152-153**
- Elliot F. & S. Co........................**148-149-150-151**
- Ramapo Iron Works........................**147**
- Ajax Forge Co........................**4th page cover**
- Morgan-Cowell Crossing Co........................**145**

Rail Joints, Nut Locks, &c.—
- Dunham Mfg. Co........................**124**
- Bush Interlocking Bolt Co.—½ page........................**125**
- Dill Nut Lock Co—½ page........................**125**
- Ruffner, Dunn & Co., Iron City Nut Lock........................**126-127**
- Eureka Nut Lock Mfg. Co........................**128**
- Harvey Track Bolts........................**129**
- National Lock Washer Co........................**130**
- Verona Nut Lock, Metcalf, Paul & Co........................**131**

Hand Cars, Tools and Implements—
- Rotary Snow Shovel Mfg. Co........................**132-133**
- Sheffield Hand Cars, Fairbanks, Morse & Co........................**134**
- Kalamazoo Hand Cars........................**135**
- Buda Hand Cars........................**136**
- Andrew Warren, Track Tools........................**140-141**
- Joyce, Cridland & Co........................**142**
- Crerar, Adams & Co........................**143**
- Ramapo Iron Works........................**147**

Steel Rails—
- Pennsylvania Steel Co........................**2d page cover**
- Union Steel Co........................**154**

Railway Signals—
- Pennsylvania Steel Co........................**152-153**
- Ramapo Iron Works........................**146**
- Palmer Torpedo Ry. Sig. Co........................**144**

Culvert Pipe—
- Blackmer & Post........................**137**

Pumps—
- Deane Steam Pump Co........................**131**

Transportation—
- Savannah, Florida & Western Ry. Co........................**138**

Railway News—
- Engineering News........................**139**

NOTE.—Should the members discover errors in this report, I can only say that the stenographer labored under unusual disadvantages. Sometimes the noise from the pavement outside the convention hall was deafening; at others, the light was poor, and at others the members who spoke did not speak with sufficient clearness and plainness to enable a clear record of their remarks to be taken.

Both the stenographer and myself have worked faithfully to correct all apparent incongruities and contradictory utterances, so as to present the language of the speakers as nearly as possible as they intended it. I hope we have met with a measure of success, and where we have failed, that members will overlook the failure.

I have been materially assisted in the preparation of these proceedings by the following named gentlemen: E. B. Groover (official stenographer), of Cleveland, Ohio; A. C. Olney, W. G. Jeffords, E. H. Reed and G. F. Parker, of Waycross, Ga.; and to the representatives of the railroad journals who attended the meetings of the convention, viz.: A. J. Stott, of the *Railway Age;* Mr. Browning, of the *Railroad Service Gazette;* and to Mr. R. G. Prout, of the *Railroad Gazette*, especially, for lithographs.

This report has been delayed on account of the large amount of work required to get it in proper shape, and for the purpose of securing as many advertisements as possible.

Very truly,
H. W. REED,
Sec. & Treas.

under progress whereby we hope to arrange with railway managements **to pass all** delegates (and their wives), who hold a certificate, **issued by the Association,** showing him to be a delegate to this convention. All who can meet with us will please notify the Secretary

Proceedings of the Sixth Annual Convention

OF THE

ROADMASTERS' ASSOCIATION OF AMERICA,

HELD AT THE

METROPOLITAN HOTEL, WASHINGTON, D. C.,

September 11th, 12th and 13th, 1888.

The Roadmasters' Association of America assembled at 10.00 **A. M., September 11th,** 1888, at the Metropolitan Hotel, Washington, D. C., for their Sixth Annual Meeting, in response to **the following call:**

ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE PRESIDENT,
CHARLESTON, S. C., July 10, 1888.

In accordance with the action of the meeting of the Roadmasters, held in Cleveland, O., October 11th, 12th and 13th, 1887, the Sixth Annual Meeting of the Association will be convened at the Metropolitan Hotel, Washington, D. C., for three days' session, at 9 o'clock A. M., Tuesday, Wednesday and Thursday, September 11th, 12th and 13th, 1888.

The committee appointed to prepare a programme of questions for discussion at this meeting have submitted the following:

1st. Standard Track Joints.
2d. Standard Hand Cars.
3d. Snow and Snow Plows.
4th. Specifications for Cross Ties.
5th. Labor on Track; Labor required under varying conditions.

DEAR SIR—You are respectfully invited to be present at this, the Sixth Annual Meeting of the Association. Arrangements are now under progress whereby we hope to arrange with railway managements to pass all delegates (and their wives), who hold a certificate, issued by the Association, showing him to be a delegate to this convention. All who can meet with us will please notify the Secretary their intention to do so, and he will furnish delegates with cer-icates, should the several railway managements consent to honor em in lieu of a pass. Should we be denied this mode of transportion, you will be promptly notified, that each one may make other rrangements for passes. Arrangements have been made for special ates ($2.50 per day) at the Metropolitan Hotel, thus insuring all vho attend a pleasant stay in the city.

Delegates' certificates will only be sent when applied for.

J. W. CRAIG,
President,
Charleston, S. C.

H. W. REED,
Sec'y & Treas.,
Waycross, Ga.

The President, Mr. J. W. Craig, of the C. & S. R. R., called the convention to order, as follows:

Mr. Craig—*Gentlemen of the Roadmasters' Association of America:* Your convention adjourned at Cleveland, Ohio, to meet in Washington, D. C., on September 11th, 1888. You are now assembled for business. I am very much gratified to see so many present to-day. I am informed that several have reached the city who are not yet present by reason of the inclemency of the weather.

The first business in order would be the reading of the minutes of last meeting, which have been distributed among you. However, unless there is an objection made, they will stand confirmed. (No objection made.) As I hear no objection, they will stand confirmed.

The Secretary, Mr. H. W. Reed, S., F. & W., called the roll, as follows—the † indicates those who answered to their names:

List of Members up to and Including the Convention of 1887.

†Adams, A. B.	W., St. L. & P.	LaFayette, Ind.
Adams, T.	B. & O.	Connelsville, Pa.
Ahern, T.	C. M. & St. P.	Calmer, Ia.
Alexander, Jno. T.	Ga. Pac.	Atlanta, Ga.
Atherton, L. E.	C. B. & K. C. R'y	Moulton, Ia.
Baker, R.	I. B. & W.	Mount Carwell, Ill.
†Baker, Z. W.	Fall Brook Coal Co.	Wellsboro, Penn.
Bailey, Isaac	W., St. L. & P.	Cowles, Neb.
†Barrett, P. W.	L. & H. R. R. R.	Warwick, N. Y.
†Barry, John	Bishopville	Atkins, S. C.
Bartlett Daniel	K. C., St. J. & C. B.	St. Joseph, Mo.
Bates, W. G.	D. & S. F. R'y.	Pueblo, Colo.
Battin, H. W.	C. & N. W. R. R.	Tracy, Minn.

axter, R. W.	S. P. Coast R. R.	Alameda, Cal.
eauprie, W. R.	M. & C. R. R.	Tuscumbia, Ala.
enson, J. A.	S. Carolina	Summerville, S.
ennett, George	C., M. & St. P. R'y	Horicon, Wis.
laine, A. L.	L. S. & M. S.	Hillsdale, Mich.
Blanton, S. T.	C. C. & A.	Batesburg, S. C.
lemer, J. R.	T. C. & St. L. R'y	Marion, Ind.
lue, A. P.	E. T. V. & Ga.	Atlanta, Ga.
oardman, E. A.	Union Pacific	Golden, Col.
olan, Mat.	Central Iowa R'y	Ackley, Iowa.
Bolan, James	D. B. C. & A. R. R.	East Towas, Mich.
Bond, B. F.	O. & M.	Flora, Ill.
Bowen, J. H.	M. P. R'y.	Lowry, Minn.
Brandt, Wm.	C. & N. W. R. R.	Madison, Wis.
Breckenridge, W. L.	C. B. & Q.	Bairdstown, Ill.
Brennan, J. J.	St. P. M. & M.	Minneapolis, Minn.
Brennan, J. C.	St. P. M. & M.	St. Paul, Minn.
Briggs, J. W.	N. P. R. R.	Olathe, Mo.
Brown, W. F.	W. & L. E. R'y	East Toledo, Ohio.
Brown, Geo. M.	Flint & Pere Marq.	East Saginaw, Mich.
Brown, S. H.	C. & N. W. R'y.	Sparta, Wis.
Brown, E.	Union Pacific	Rawlins, Wyoming.
Brown, Robt.	St. L. A. & T.	Malden, Mo.
Brunk, T. J.	Wisconsin Central	Oskosh, Wis.
Buel, H. A.	C. M. & St. P. R'y.	Redwing, Minn.
Buhrer, C.	C., Santa Fe & Cal.	Streator, Ill.
†**Burgwin**, J. H. K.	G. R. & I.	Petoskey, Mich.
†**Burgdorf**, C. W.	Union Pacific	Denver, Col.
Burke, P. D.	Central Pacific	Minot, Dak.
Burnett, C. M.	Central Iowa	Marshalltown, Iowa.
Burnett, I.	Supt. Joliet Steel Co.	Joliet, Ill.
urns, M. F.	U. P. R. R.	Boulder, Col.
utler, John	I. C.	Pontiac, Ill.
yrne, Hugh	L. N. A. & C.	Bloomington, Ind.
affrey, Richard	Lehigh Val. R'y.	Whitehaven, Penn.
ain, Geo. E.	W. St. L. & P. R'y.	Decatur, Ill.
ampbell, G. R.	O. C.	Bucyrus, Ohio.
well, W. E.	A. T. &. S. F. R'y.	Nickerson, Kan.
le, J. D.	B. C. R. & N. R'y.	Watertown, Dak.
nahan, W. J.	T. & P. R. R.	Weatherford, Tex.
les, E. H.	C. St. P. M. & C.	St. James, Minn.
ey, C.	Ill. Central	LeMars, Iowa.
in, Dennis	O. & M.	North Vernon, Ind.
rn, J.	N. P.	Jamestown, Dak.
py, J. H.	N. Y. C. & St. L.	Bellevue, Ohio.

Conners, J. S.	Canadian Pac.	Winnipeg, Manitoba.
†Cornell, C. H.	C. M. & St. P.	Dubuque, Iowa.
Cox, J. E.	C. M. & St. P.	Sanborn, Iowa.
Cox, Frank	C. R. I. & P.	Atlantic, Iowa.
Cox, A.	C. St. P. M. & O.	LeSueur, Minn.
Coughlin, W. J.	C. M. & St. P. R'y.	Mason City, Iowa.
†Courtney, W. H.	L. S. & M. S.	Erie, Penn.
†Craig, J. W.	C. & S.	Charleston, S. C.
Crippen, J. H.	C. M. & St. P.	Sioux City, Iowa.
Cronin, Thomas	Mo. Pac. R'y.	Palestine, Texas.
Crowley, Wm.	A. & P. R. R.	Williams, Ariz.
Cummings, John	C. P.	North Bay, Ont.
Cummings, Wm.	L. N. O. & T.	New Orleans, La.
Daily, M. R.	B. N. Y. & P	Buffalo, N. Y.
Daley, P. W.	L. E. & W. R. R.	Lima, Ohio.
†Davey, E. C.	S. C. F. S. & M.	Springfield, Mo.
Davies, Colin A.	L. & N.	Paris, Tenn.
†Davis, Garrett.	B. C. R. & N.	Riverside, Iowa.
DeCourcy, John	R. & D.	Charlottesville, Va.
Devine, M. W.	A. C. Line	Rocky Mount, N. C.
Dickson, J. B.	Penn. Co. C. & P. R'y.	Wellsville, Ohio.
Dickson, J. A.	B. N. & C. R. R. R.	Rochester, N. Y.
†Dickson, Thomas	C. & P.	Wellsville, Ohio.
†Diddle, W G.	C. & O. R.	Kansas, Ill.
†Diddle, A. J.	I. D. & S.	Indianapolis, Ind.
Dodson, John A	G C. & N.	Monroe, N. C.
Donahoe, W. J.	C., R. I. & P.	Iowa City, Iowa.
Donovan, J.	Canada Pacific	Winnipeg, Manitoba.
Doom, John P.	C. & W. I.	Chicago, Ill.
Downing, G. W.	N. P. R. R.	Little Falls, Minn.
Doyle, John	D. L. & N.	Ionia, Mich.
Drury, E. G.	C., M. & St. P. R. R.	Marion, Iowa.
Dunn, Wm.	B. & O. R'y.	Newark, Ohio.
Dwyer, Thomas	M. L. S. & W.	Meyershaenser, Wis.
Edwards, E. P.	C. & N. W. R. R.	Webster City, Iowa.
Erbey, W.	C., M. & St. P. R'y.	Perry, Iowa.
Erickson, L.		Galvin, Ohio.
Erwin, Wm.	K. & P. R'y.	Kingston, Ont.
Evans, J. C	Illinois Central	
Finn, J. D.	N. P. R. R.	Billings, Montana.
†Fitzgerald, Thos.	Shenandoah Valley R'y	White Past, Va.
Fitzpatrick, T	S. P. R R	Sierra Blanco, Tex
Floriet, V. D.	Mex. Nat.	City of Mexico, M
†Flynn, Luke	C. & N. W. R. R.	Eagle Grove, Iow
Foracre, W. W.	Ga. Pac. R'y	Douglasville, Ga.

es	A. & N. M. R'y	Lordsburg, New Mex.
. N.	A. C. Line	Sumter, S. C.
n	St. L., Fort S. & W.	Eldorado, Kan.
I.	W. C. R. R.	Ashland, Wis.
. X.	L. E. & W.	Lima, Ohio.
T.	O. C. R. R.	Grant's Pass, Ore.
	M. H. & O.	Ishpenning, Mich.
	T. P.	Dallas, Tex.
B.	U. P. R. R.	Sterling, Col.
	N. Y., W. S. & B.	Detroit, Mich.
I.	L. & N. R. R.	LaGrange, Ky.
J.	R. & A.	Richmond, Va.
	O. R. & N. R. R.	The Dalles, Ore.
	N. P. R. R.	Billings, Montana.
	C., M. & St. P.	Waukesha, Wis.
	C. B. & Q.	Villisca, Iowa.
H.	C., M. & St. P.	Monticello, Iowa.
	I. I. & I. R'y	Kankakee, Ill.
n	Southern Pacific R'y	Houston, Texas.
	C. & S.	Ridgeland, S. C.
M	L. & N.	LaGrange, Ky.
es	D. & R. G. W. R. R.	Salt Lake, Utah.
C. P.	R. & D. R. R.	Atlanta, Ga.
	Fargo Southern	Fargo, Dak.
D.	Ohio & Miss.	Aurora, Ind.
H. E.	Ore. & Cal.	Portland, Ore.
	A. T. & S. F.	Emporior, Kan.
	Cen. Pac.	Ogden, Utah.
W.	C. S. & M.	Marion, Ala.
. M.	Norfolk Sou.	Berkley, Va.
seph	K. C. St. J. & C. B.	St. Joseph, Mo.
W.	C., M. & St. P.	Horicon, Wis.
A.	N. Y., L. E. & W.	Buffalo, N. Y.
I. C.	Atl. & Pac. Ry.	Daggatt, Cal.
. H.	C., M. & St. P.	Perry, Iowa.
nothy	M. C. R. R.	Jackson, Mich.
omas	C., R. I. & P. R. R.	Genesee, Ill.
J. D.	Southern Kan.	Lawrence, Kan.
	C., M. & St. P.	Wells, Minn.
	N. P. Ry.	Bozeman, Montana.
	C., B. & Q. R. R.	Red Oak, Iowa.
R. A.	Wabash	Defiance, O.
eo. B.	L. S. & M. S.	Norwalk, Ohio.
I. H.	L. S. & M. S. Ry.	Elyria, Ohio.
	C., M. & St. P.	Chillicothe, Mo.

Howe, P.	B. C. R. & N.	Estherville, Iowa.
Hutchison, H.	B., N. Y. & P.	Olean, N. Y.
Hyde, A. B.	C. M. & St. P.	Albert Lee, Minn.
†Jackson, J. M.	J. S. E. Line	Havana, Ill.
Jacobs, P. H.	C. & N. W. R. R.	Winona, Minn.
Jolly, J. S.	Fla. Sou. Ry.	Rochelle, Fla.
Jones, C. E.	C. B. & Q. R. R.	Beardstown, Ill.
†Jordon, O. F.	M. C. R. R.	St. Thomas, Ont.
†Keller, C. B.	White Water R. R.	Cambridge City, Ind
Keller, L. L.	Texas Pac. Ry.	Big Springs, Texas.
Kelley, M. D.	St. P. & D. R. R.	St. Paul, Minn.
Kelley, J. B.	C. M. & St. P. Ry.	Cologne, Minn.
Kelley, P. J.	C. I. St. L. & C.	Kankakee, Ill.
†Kerwin, J. A.	C. & N. W. R. R.	Madison, Wis.
Kindelan, J.	C. M. & St. P. Ry.	Mitchell, Dak.
Kinney, J.	C. M. & St. P. Ry.	Oxford Junc., Iowa.
Kirbey, James	Southern Pacific	Shulenburg, Tex.
†Kitell, E. R.	C. & N. W. R. R.	Chicago, Ill.
Larr, G. W.	W. St. L. & P.	Essex, Ill.
Lavoix, Chas.	B. R. B. & L. Ry.	Winthrop, Junc., Ma[illegible]
Lee, W. F.	C. R. I. & P.	Keokuk, Iowa.
Lem, L.	Tex. Pac. Ry.	Baird, Tex.
Lehman, C. H.	C. & N. W. R. R.	Sterling, Ill.
Lewis, Geo. W.	D. & R. G. Ry.	Durango, Col.
†Linsley, J. H.	C. B. & Q. Ry.	Galesburg, Ill.
Lockie, George J.	A. T. & S. F. Ry.	Newton, Kan.
Loftus, P. H.	C. & N. W. Ry.	Milwaukee, Wis.
†Lovell, D. H.	Penna. R. R.	Renova, Penn.
Lynch, Pat.	I. B. & W.	Urbana, Ill.
Lynch, James	N. P.	Sprague, W. T.
Madigan, T. J.	T., St. L. & K. C. Ry.	Charleston, Ill.
Mahony, M.	W. C. & W. M.	Chippewa Falls, Wis.
Mahony, D.	O. M. Ry.	Olney, Ill.
Mallard, Chas. C.	Morgans La. & T.	New Orleans, La.
†Mandeville, J. O.	Lehigh Valley	Hazleton, Pa.
Manning, W. T.	B. & O.	Pittsburg, Pa.
Marsh, F. M.	S. C. & P.	Missouri Valley, Iowa.
Massey, V. M.	N. P. Ry.	Spokane Falls, W. T.
Mayer, J. A.	St. P., M. & M.	Minneapolis, Minn.
McAvoy, Anthony	M. & L. R. Ry.	Brinkly, Ark.
McBride, James	St. L. & C. S.	Chesterfield, Ill.
McClintock, W. H.	L. & N.	Louisville, Ky.
McCormack, P.	M. & C. Ry.	Iuka, Miss.
McDonald, J. H.	C. & N. W.	Escanaba, Mich.
McDonough, M.	Texas Pacific	Marshall, Texas.

Chas.	B. C. R. & N. Ry.	Sibley, Iowa.
r, D.	W. & L. E.	Norwalk, Ohio.
	N. P. Ry.	Brainard, Minn.
J.	Grand Trunk	Brockville, Ont.
F. H.	Wabash Ry.	Moberly, Mo.
M. J.	N. Y., P. & O.	Mansfield, Ohio.
M.	Mo. Pac.	Emporia, Kan.
L.	St. I. M. & S.	Little Rock, Ark.
, Geo. C.	W. I. & N.	Marshalltown, Iowa.
John	C. M. & St. P. Ry.	Minneapolis, Minn.
M.	C. M. & St. P. Ry.	Elgin, Ill.
P. W.	D. L. & W. Ry.	Mt. Morris, N. Y.
J. C.	C., I., St. L. & C.	Indianapolis, Ind.
W.	A. & P.	Albuquerque, N. Mex.
W.	L. S. & M. S.	Goshen, Ind.
has.	W., St. L. & P.	Jacksonville, Ill.
	Southern Central	Moravia, N. Y.
F.	C., M. & St. P.	Mazomanie, Wis.
	C. M. & St. P. Ry.	Faribault, Minn.
M.	G. C. & San. F. Ry.	San Antonia, Tex.
mas	Chic. & Alt.	Kenton, Ohio.
	Illinois Central	Waterloo, Iowa.
	N. Y. C. & N.	High Bridge, N. Y.
	C., I., St. L. & C.	Greensburg, Ind.
illis	S., F. & W. Ry.	Waycross, Ga.
F.	N. P.	Missoula, Montana.
	C. J., St. L. & C.	Indianapolis, Ind.
	G. B. W. & St. P.	Plover, Wis.
Edward	C. W. & M.	Elkhart, Ind.
R. D.	C. S.	Somerset, Ky.
	G. C. & S. F.	Indianapolis, Ind.
	M. St. P. & S. S. M.	Minneapolis, Minn.
	O. P. Ry.	Daggett, Cal.
G. B.	North Eastern	Florence, S. C.
M.	C. R. I. & P.	Joliet, Ill.
	N. O. & T.	Birmingham, Ala.
seph	Ill. Cent.	Champaign, Ill.
	D. & R. G. Ry.	Grand Junc., Colo.
	K. & W.	Centerville, Iowa.
nis	Penn. & N. Y. C.	Auburn, N. Y.
rtin	F. R. & N. Co.	Waldo, Fla.
F.	C., St. P., M. & O. Ry.	St. Paul, Minn.
H.	N. & M. Ry.	Midway, Ky.
S.	C., M. & St. P. Ry.	Elgin, Ill.
mas H.	L. E. & W. Ry.	Bloomington, Ill.

Perry, J. A.	R. & D.	Charlottesville, Va.
†Peters, P.	A., T. & S. F. Ry.	Newton, Kan.
Phelon, E. W.	C., M. & St. P. Ry.	Millbank, Dak.
Philbim, M.	C., R. I. & P.	Joliet, Ill.
Phillips, John	Ohio & Miss.	Lebanon, Ill.
Pierce, H.	C., H. & D. Ry.	Cincinnati, Ohio.
Plunkett, P.	M., L. S. & W. Ry.	Clintonville, Wis.
Potter, W. H.	C., M. & St. P.	Tama City, Iowa.
†Preston, J. H.	C., R. I. & P.	DesMoines, Iowa.
Purcell, M.	J. M. & I. Ry.	Columbus, Ind
Rafferty, Thomas	C., M. & St. P. Ry.	Lanesboro, Minn.
Rabun, J. H.	P. & N. Y. C.	Towanda, Pa.
†Ramsey, John P.	C. H. & D.	Connersville, Ind.
Raynor, T. N.	C. & G. T.	Battle Creek, Mich.
Ready, M.	Vandalia Line	Effingham, Ill.
†Reed, H. W.	S., F. & W.	Waycross, Ga.
Reeves, O.	C. & N. W.	Marietta, Wis.
Reilly, Phillip	P. & N. Y. C.	Tunkhannock, Pa.
Reilly, Wm.	C. & A. Ry.	Bloomington, Ill.
Repelye, John	U. P.	Denver, Col.
Reton, V. A.	C. M. & St. P.	Monroe, Wis.
Richards, O. D.	L. S. & M. S.	Andover, Ohio.
Roach, P. K.	O. & M.	Pana, Ill.
Roberts, John	I. B. & W. Ry.	Columbus, Ohio.
Robbins, W. L.	E. & T. H.	Evansville, Ind.
Robinson, T. V.	C. St. L. & P.	Algona, Iowa.
Robinson, W. D.	C. & N. W.	Carroll, Iowa.
Rogers, James	L. N. A. & C.	Louisville, Ky.
†Ross, John	F. & P. M. Ry.	Evart, Mich.
Ross, Donald	D. G. H. & M.	Pontiac, Mich.
Rowan, M.	C. N. O. & T. P.	Hattiesburg, Miss.
Rustine, Bryan	D. L. & N. Ry.	Ionia, Mich.
Ryan, James	C. & E. I.	Danville, Ill.
Ryan, J. C.	U. P.	Denver, Col.
Sagerdahl, Wm.	C. & G. T.	Valparaiso, Ind.
Salter, J. F.	Miss & Tenn.	Sardis, Miss.
Sawyer, F. E.	St. L., K. & N. W.	Keokuk, Iowa.
Scanlin, Patrick	C. & N. W.	Boone, Iowa.
Schofield, John	J. H. & I. Ry.	Brazil, Ind.
Schofield, James	Northern Pacific	Livingston, Mont.
Scott, J. W.	C. O. & S. W. Ry.	Cecilia, Ky.
Scott, S. G.	G. R. & I. Ry.	Kalamazoo, Mich.
Sharkey, P.	K. C., St. J. & C. B. Ry	Council Bluffs, Iowa
Shattuck, C. D.	C., M. & St. P.	Faribault, Minn.
Shaw, G. R.	O. R. & N. Co.	Portland, Ore.

n F.	R. W. & C.	Carthage, N. Y.
	C. N. O. & T. P.	Somerset, Ky.
H.	Lehigh Valley	Buffalo, N. Y.
D.	C. I. Ry.	Keithsburg, Ill.
C. F.	B. & M.	Ranenna, Neb.
niel, Jr.	B., N. Y. & P. R. R.	Olean, N. Y.
r, J. P.	C., M. & St. P. R. R.	Sioux City, Iowa.
hn	I. B. & W. Ry.	Indianapolis, Ind.
mes	C. & E. I. Ry.	Danville, Ill.
W. T.	St. L., A. & T.	Texarkana, Tex.
P.	T., St. L. & T. C.	Delphos, O.
chard	Southern Pac.	Houston, Tex.
C.	C. K. & N.	Herrington, Kan.
	O. R. & N.	Umatilla Junction, Ore.
	C. B. & Q. Ry.	Rock Island, Ill.
e, R. J.	Danbury & Norwalk	Danbury, Conn.
M. A.	Central Iowa.	Oskaloosa, Iowa.
R.	W. St. L. & P.	Marshall, Mich.
L.	P., D. & E. Ry.	Grayville, Ill.
	C., M. & St. P. Ry.	Marion, Iowa.
V. B.	G. R. & I. Ry.	Grand Rapids, Mich.
l, C. H.	C., M. & St. P. Ry.	Coon Rapids, Iowa.
hn	L. S. & M. S.	Coldwater, Mich.
J.	Illinois Central	Dubuque, Iowa.
M.	So. Pac.	Hambrook, Cal.
tt, W. B.	Car. Cent.	Maxton, N. C.
d, A. M.	C. & N. W Ry.	Escanaba, Mich.
F.	S.C. Div. P. & N. Y. C.	Auburn, N. Y.
	Denver & R. G.	Canon City, Col.
S. L.	W. St. L. & P.	Cuba, Ill.
	M. & N. W.	Elma, Iowa.
L.	G. H. & S. A. Ry.	Houston, Texas.
s, J.	C. H. & D.	Lima, Ohio.
, W. A.	C. & G. T.	Blue Island, Ill.
, J. C.	C. St. P. M. & O.	Black R. Falls, Wis.
B.	C., M. & St. P.	Tomah, Wis.
, James	S. C. R. R.	Kingsville, S. C.
John	U. P.	Kansas City, Mo.
Nicholas	T. & P. M. Ry.	Ludington, Mich.
J. C.	Ft. W., C. & L. Ry.	Bluffton, Ind.
V. J.	E. S. R. R.	Eureka Springs, Ark.
	Can. Pac.	Three Rivers, Que.
omas.	Ohio & Miss Ry.	Mitchell, Ind.
m.	Can. Pac.	Three Rivers, Que.
arson	C. C. & A. Ry.	Rock Hill, S. C.

Wyman, M. P.	Northern Pac.
Wilderson, L.	W. & L. E.
Willis, R. A.	C. St. P. M. & O.
Williams, G. M.	
Wiseman, J. B.	C., B. & Q.
Wilson, D. C.	W. St. L. & P.
Witty, J. B.	I. W.
Worley, Geo.	Hot Springs
Worthly, A. H.	K. C. St. J. & C. B. Ry

The following list of new members pr
then read—the † indicating those who w

R. M. A. OF AMERI

List of Members Joining the Association since
up to and including the Conventi

Archer, G. M.	S., F. & W. Ry.
Ayer, G. E.	A., T. & St. F.
Bernard, Thos.	R. & D.
†Bentley, H. H.	B. R. R.
†Black, Robert	M. E.
Block, Duncan	C. P.
Blue, C. F.	K. C. M. & B.
Burke, J. T.	S. & E. F. (So. Pac.)
Bushnell, J. W.	F. C. & P.
Cantree, S. T.	E. & W.
Conley, P. J.	St. L. & A. T.
Cuyler, C. H.	[illegible]

Gaunt, J. M.	M. K. & T.	Waco, Tex.
Geddes, J. K.	B. Z. & C.	Zanesville, Ohio.
Green, F. W.	C. P.	Brandon, Manitoba.
†**Houghton**, G. A.	L. S. & M. S.	Andover, Ohio.
Howes, L. C.	D. S. P. & P.	Denver, Col.
†**Hyland**, R.	C. & M.	Keene, N. H.
Johnson, O.	C. P.	Manitou, Manitoba.
Kearns, John	C. & A.	Springfield, Ill.
Kellett, J.	C. P.	Medicine Hat, Assiniboia, Can.
Kidd, J. J.	C. & M.	Cambridge, Ohio.
Lamb, J. F.	S., F. & W.	Thomasville, Ga.
†**Lyons**, H.	A., T. & S. F.	Kiowa, Kan.
McCarthy, D.	J., T. & K. W.	Palatka, Fla,
†**McCarthy**, J.	St. L. & S. F.	Springfield, Mo.
McDonald, F.	C., B. & Q.	Savanna, Ill.
†**McGarr**, W. L.	B. C.	Lock Haven, Pa.
†**McGee**, D. A.	S., F. & W.	Savannah, Ga.,
McGowan, O.	St. L., A. & T.	Dallas, Tex.
McGregor, S.	U. P.	Sidney, Neb.
McMillan, W. J.	M. C. & Ft. D.	Mason City, Ia.
McNulty, W. H.	A., T. & S. F.	Rincon, New Mex.
Moore, C. P.	A., T. & S. F.	Great Bend, Kan.
Mullen, T. J.	C. M. & St. P.	Wabash, Minn.
Mungavin, P. J.	N. P.	Superior, Wis.
Neale, J. M.	C. K. & N.	Wichita, Kan.
Neher, C. R.	R. & D.	Burlington, N. C.
Nelligan, W. D.	A., T. & S. F.	Spivey, Kan.
Noble, F. A.	C. P.	Sudbury, Ontario, Can.
†**Offutt**, G. W.	L. I.	Long Island City, N.Y.
Panser, C. J.	C. P.	Winnipeg, Manitoba.
Parker, R. J.	A., T. & S. F.	Newton, Kan.
†**Patch**, J. R.	Con. River	Springfield, Mass.
Porter, A. H.	C. R. R.	Augusta, Ga.
Prentice, G. H.	L. S. & M. S.	Cleveland, Ohio.
Ratliff, W. R.	S., F. & W.	Waycross, Ga.
Rockhold, J. C.	A., T. & S. F.	Arkansas City, Kan.
Sharpe, W. W.	S., F. & W.	Waycross, Ga.
Sing, J. W.	A. C. L.	Lanes, S. C.
Southgate, R.	R. & D.	Columbia, S. C.
Stiarwalt, W. L.	D., Ft. W. & C.	Pleasant Hill, O.
†**Stearns**, W. H.	C. & N. W.	Oak Park, Ill.
Stettler, J. H.	A., T. & S. F.	Great Bend, Kan.
Sullivan, J. D.	C. K. & N.	Horton, Kan.
Supplee, J.	Penna.	Erie, Pa.
Teller, C. B.	A., T. & S. F.	Pueblo, Col.
Tracy, W. E.	Mo. Pac.	Yates Center, Kan.
Walters, Robert	M. & N. W.	Portage LaPrairie, Manitoba.

The President—You have heard the list of parties who ha made application for membership of this Association.

On motion they were all accepted.

The Secretary read the following communications:

Dictated]

MAYOR'S OFFICE, WM. SCOTT LEE, Mayor,
E. S. CHAPIN, Private Sec'y.
DENVER, COLO., Aug. 20th, 1888.

To the Roadmasters' Association of America, in Session at Wa-ington, D. C.:

GENTLEMEN—While you are deliberating upon the place wh you will hold your next annual meeting, I desire to call your atte tion to the "Queen City of the Plains," a city which has gro rapidly within the past few years, until it is now one of the m beautiful cities in America, with ample hotel accommodations, t finest climate in the world, and with all the facilities for the ho ing of such a meeting as your gathering will be. If you decide hold your session in Denver next year you will find our people h pitable, and your welcome will be cordial.

I have the honor to be,
Your obedient servant,
(Signed) WM. SCOTT LEE,
Mayor of Denver, Colo.

I am sure that any city in Colorado would be glad to welcome an entertain your Association, and, when selecting a place for you next annual meeting, I hope you will turn your thoughts towar the West, and not forget the advantages of the Centennial State.

(Signed) ALVA ADAMS,
Governor of Colorado.

THE DENVER CHAMBER OF COMMERCE
AND BOARD OF TRADE,
Secretary's Office,
DENVER, COLO., Sept. 3d, 1888.

Chas. W. Burgdorf, Esq., Denver, Colo.:

DEAR SIR—Please convey the following invitation to the convention to which it is addressed, and oblige,

Yours respectfully,
(Signed) D. FLETCHER.

To the Roadmasters' Association of America:

GENTLEMEN—On behalf of the citizens of Denver, in general, represented in the Chamber of Commerce and Board of Trade, most cordially invite you to hold your next convention in Denve and assure you that if you come we shall do everything in our pow give you the most delightful time your honorable and highly-spected Association has ever had in its life. Be sure you come.

Respectfully,
(Signed) DONALD FLETCHER,
Pres't Chamber of Commerce and Board of Trade.

On motion, it was moved and carried unanimously that the bove letters of the Mayor—Mr. Wm. Scott Lee, the Governor —Mr. Alva Adams, and the President of the Chamber of Commerce and Board of Trade—Mr. Donald Fletcher, be received and made a part of the proceedings of this convention, and the thanks of the Association returned.

The President—It is not necessary, perhaps, for you all to know it, but there are many members not present here to-day, and it will be necessary for them to know from the proceedings of the convention what the President and Secretary of the Association are doing. I sent to every member of the Association a circular letter, which the Secretary will now read. Read as follows—it being voted unanimously that it be made a part of the printed proceedings of the convention:

THE ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE PRESIDENT,
CHARLESTON, S C., Aug. 1st, 1888.

MY DEAR SIR—You have been advised by circular letter that the Sixth Annual Meeting of the Association will be convened at the Metropolitan Hotel, Washington, D. C., for three days' session, at 9 o'clock A. M., Tuesday, Wednesday and Thursday, September 11th, 12th and 13th, 1888. In order to infuse some vitality into the proceedings, and with the hope of raising our Association to its proper position among the several similar associations, I invite your cooperation and ask your aid. I earnestly beg that you will consider this, my request, and comply.

I know it is not always convenient, nor can a Roadmaster always leave his road on a fixed date for a week or ten days. I must, however, beg all that can possibly get off to meet with us at Washington. I have sent out five hundred circular letters to Roadmasters, urging them to join our Association and meet with us at Washington. As a result, applications for membership are coming in daily, and the attendance at the Washington meeting will, I think, surpass that of any meeting yet held. I am now arranging for free transportation. If you can meet with us, please notify the Secretary at once of your intention to do so, and he will furnish you with a delegate's certificate, together with a list of the roads over which will pass you.

Delegates' certificates will only be sent when applied for.

Hoping to meet you at Washington,

Very truly yours,
J. W. Craig,
President R. M. A.

The President—The next thing in hand was to provide f transportation for all who might attend. I sent two hundre and eighty circular letters to managing officers of railways i the United States and Canada, and this is the form of circul letter I sent.

(It was read by the Secretary, as follows, and it was vote that it be made a part of the proceedings of the convention):

THE ROADMASTERS' ASSOCIATION OF AMERICA.

Office of the President,
Charleston, S. C., ... , 1888.

....

Dear Sir—With this I hand you a certificate, which, when fill and signed by the President and Secretary of our Association, w show the name of the roadmaster (who will be a delegate to t Sixth Annual Roadmasters' Convention, to be held in Washingto D. C., September 11th, 1888,) and the road upon which he is e ployed.

Will you kindly honor such certificate, in lieu of a pass over yo road, for said Roadmaster and wife, from the 1st to the 25th of Se tember, 1888?

The object of our meeting in annual convention is to erect a maintain thorough concert of action and interchange of ideas, a ge erous and spirited rivalry of thought, and to effect a high and pra tical standard for our department. This means attentive and inte ligent consideration of the several problems presented from time time for our solution, and the adoption of all improvements in wa and means to resist the encroachment of time and decay; quick a generous recognition of every aid that experience and intelligen of others shall have demonstrated to be desirable, and a careful a prudent use of means as well as men; also to garner, for mutual be efit, the fruits of our annual experience; in a word, with every inte ligence on the alert, striving to make a perfect roadway.

At our meetings we have the experience of from five to thirty years. We hope you will honor our certificate when properly presented. You can retain the certificate enclosed for bulletin use; will send as many more as you desire.

An early reply will oblige,

Very truly yours,

J. W. CRAIG,

President R. M. A.

The President—The replies to that circular are known to you all. There were a large number of roads that would not comply therewith, and they gave as a reason the existence of the inter-state commerce law. I gave them another trial, sending them the following circular letter.

(Read by the Secretary, as follows):

THE ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE PRESIDENT,
CHARLESTON, S. C., Aug. ...., 1888.

DEAR SIR—I am in receipt of your letter .... in reply to my circular letter .... relative to honoring delegates' certificates, in lieu of a pass, over your line, for Roadmasters attending the Sixth Annual Meeting of the Roadmasters' Association of America. I regret to learn that you cannot recognize the certificates as presented by the Association. Pardon me for again asking if you will kindly order the certificates honored when *endorsed by the General Manager or Superintendent* of the railroad in whose employ the delegate is, certifying that he is in such service. This is done by the Baltimore and Ohio and other roads. Hoping you will favor our Association, an early reply will oblige,

Very truly yours,

J. W. CRAIG,

President R. M. A.

The President—That did not seem to do much good, however, and I sent them this circular letter. (Showing. Applause.)

(Read by the Secretary, as follows):

THE ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE PRESIDENT.
CHARLESTON, S. C., August... 1888.

. . . .

. . . .

. . . .

DEAR SIR—In acknowledging receipt of your letter .... allow me, on behalf of the Roadmasters' Association of America, to thank you kindly for honoring delegates' certificates to our Sixth Annual Convention. As requested, I send you herein enclosed .... certificates for bulletin use.

Very truly yours,
J. W. CRAIG,
President R. M. A.

The President—It is unnecessary to read a list of the road that agreed to honor these certificates; however, I think proper that it should form a part of the proceedings of th Association in convention assembled.

On motion it was so voted.

THE ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE PRESIDENT.
CHARLESTON, S. C., August 14th, 188

DEAR SIR—All roads in this list will pass you on delegate's c tificate, in lieu of a pass. Roads designated thus: ‡, will not p your wife on delegate's certificate.

The Baltimore and Ohio Railroad will pass you (but not your wif on delegate's certificate, when endorsed by General Manager Superintendent, certifying you are an employee of the road name in the certificate.

The Chicago and Alton Railroad, upon presentation of certificates endorsed by General Manager or Superintendent, to the Gener Passenger Agent, St. Louis, and D. Bowers, General Western Pas senger Agent, Kansas City, will issue transportation to delegates.

The Chicago, St. Paul, Minneapolis and Omaha Railway, will, upon presentation of certificates at the General Manager's office, St. Paul, issue passes to delegates and their wives.

The Chicago and Northwestern Railway, the General Manager J. M. Whitman, Chicago, writes me: "I will be very glad to furnish to such Roadmasters as may wish to use our line in passing to or fro the convention free transportation for themselves and their wive which they can obtain from me by enclosing their credentials, wit request for what transportation they need."

The Burlington and Missouri River Railroad, in Nebraska, the eneral Agents at Denver and Pacific Junction will honor certifi-ates when endorsed by General Manager or Superintendent.

The "Bee Line" will grant passes upon my request, which will be ade when applied for.

All other roads write me that, owing to the interstate-law, equest for free transportation must be made either by the General Manager or Superintendent of the road on which the delegate is mployed.

Certificates are good from the 1st to the 25th of September, 1888.

Very truly yours,

J. W. Craig,

President R. M. A.

Alabama Great Southern Railroad.
Beech Creek Railroad.
Cincinnati, Indianapolis, St. Louis and Chicago.
Columbus, Hocking Valley and Toledo Railway.
Chicago, Kansas and Nebraska Railway.
Cairo, Vincennes and Chicago Line.
Cape Fear and Yadkin Valley Railway.
Cincinnati Scuthern Railway.
Carolina Central Railroad.
Charleston and Savannah Railway.
Connecticut River Railroad.
Central Railroad System, South Carolina and Georgia.
Chicago, Burlington and Quincy Railroad.
Cleveland, Akron and Columbus Railway.
Cleveland and Marietta Railway.
Central Vermont Railroad.
Chicago, Peoria and St. Louis Railway.
Current River Railroad.
Dunkirk, Alleghany and Pittsburg Railroad.
‡Denver, Fort Worth and Texas Railroad.
‡Delaware, Lackawanna and Western Railroad.
Denver and Rio Grande Western Railway.
East and West Railroad of Alabama.
Fort Wayne, Cincinnati and Louisville Railroad.
Green Bay, Winona and St. Paul Railroad.
Georgia Railroad.
Georgia Pacific Railway.
Gulf, Colorado and Santa Fe Railroad.
Hannibal and St. Joseph Railroad.
Indiana and Illinois Southern Railroad.
Indiana, Illinois and Iowa Railroad.
Indianapolis, Decatur and Springfield Railroad.

Jacksonville Southeastern Railway.
Kansas City, Fort Scott and Memphis Railroad.
Kansas City, Clinton and Springfield Railway.
Kansas City, Memphis and Birmingham Railroad.
Kansas City, St. Joseph and Ccuncil Bluff Railroad.
Kansas City, Fort Scott and Gulf Railroad.
Keokuk and Western Railroad.
Litchfield, Carrollton and Western Railroad.
Lake Erie and Western Railroad.
‡Louisville, New Albany and Chicago Railroad.
New Orleans and Northeastern Railroad.
New York, Susquehanna and Western.
Ohio and Northwestern Railroad.
Ohio Central Railroad.
Pittsburg and Western Railway.
Pittsburg and Lake Erie Railroad.
Raleigh and Gaston Railroad.
Raleigh and Augusta Air Line Railroad.
‡Southern Pacific Railway (Atlantic System).
Savannah, Florida and Western Railway.
Seaboard and Roanoke Railroad.
South Carolina Railway.
St. Louis, Alton and Terre Haute Railroad
St. Louis, and Central Illinois Railroad.
St. Louis Arkansas and Texas Railroad.
‡Texas and Pacific Railway.
Toledo, Ann Arbor and North Michigan Railway.
Terre Haute and Peoria Railway.
‡Toledo, Peoria and Western Railroad.
Vicksburg and Meridian Railroad.
Vicksburg, Shreveport and Pacific Railroad.
Western and Atlantic Railroad.
Western Maryland Railroad.
‡Wheeling and Lake Erie Railroad.

I have had these communications read to inform you efforts made to secure free transportation to all membe this is the result. The general managers of some of th seemed to think that the inter-state commerce law was way, and would not allow free transportation to Roadı except on request of their superintendent or general mana section 22 of the inter-state commerce law reads that will be granted when application is made by the ma officer of the road for an employee of another road. President of this Association, they did not look upon ı "managing officer." So Mr. Mellen of the Wisconsin Central referred the matter to the Western Passenger Association, and this is the reply he sent me:

WISCONSIN CENTRAL ASSOCIATED LINES.

OFFICE OF THE GENERAL MANAGER,
MILWAUKEE, WIS., Sept. 5th, 1888.

John W. Craig, Esq., Pres. R. M. Asso., Charleston, S. C.:

DEAR SIR—Referring to your letter of Aug. 6th and my letter of Aug. 13th, it has been decided by the Western States Passenger Association not to honor delegates' credentials for transportation, but if any of the delegates, with their wives, desire to go over this road, it will afford me great pleasure to issue passes to them on receipt of written application from the managing officer of the road with which the delegate is connected.

Yours truly,
W. S. MELLEN,
General Manager.

The President—I think this is the most important communication ever received by us relative to the transportation of Roadmasters, because it settles this question in the West.

I must say that it affords me a great deal of pleasure to meet here to-day the President and Secretary of the Roadmasters' Association of New England. These gentlemen have not only favored us with their presence, but joined the Association. I think, probably, if we had gone to Boston we might have taken them all in. [Applause.] We will try and improve on it the next time. I presume you have all met those gentlemen—Mr. Patch, the President, and Mr. Ellis, Secretary; also, Mr. Hyland, a member of the Association, who is present with us.

J. H. Preston—C. R. I. & P.—I would like to offer a motion. The first question for discussion is "Standard Track Joints." In view of the fact that there are many Roadmasters who have not arrived in town, and I think there will be many more here this afternoon, and that this, perhaps, is a question of the most importance of any on our list, I would, therefore, move that we adjourn until 3.00 this afternoon, in order to give all Roadmasters that may arrive a chance to discuss this question. I think every Roadmaster should have an opportunity to offer his opinion, and unless we adjourn this opportunity will not be given

them. Further, there will, perhaps, be new members who will join, as well as others arrive this afternoon.

Motion seconded.

The President—I will add to Mr. Preston's remarks, that I have advices from many Roadmasters that they will be here, and they have not yet arrived. Before putting the question I will say to all members that it is absolutely necessary for us to be promptly on time. I do not like to call the meeting to order unless we have a good attendance. I beg that you appear here promptly at 3.00 o'clock, and we can then dispose of our business and be able to devote some attention to the points of interest in the city of Washington.

Adjourned until 3.00 P. M.

Afternoon Session.

TUESDAY AFTERNOON, September 11th, 1888.

ıe convention was called to order at 3 o'clock P. M., Presi- Craig in the chair.

ıe President—The first subject for discussion is "Standard k Joints." Several members of this committee are not ent, delayed, no doubt, by the storm. Mr. Chairman, are ready to report?

. Richard Caffrey—Lehigh Valley R. R.—Mr. President Committee on Standard Track Joints, of which I am chair- , consisted of seven members. I have written to all of the nittee and received answers from four and no answers from There are present here now three of the committee be- the chairman; one of the committee, from whom I have d, has not arrived yet—Mr. Hanover. Mr. Riley and Mr. n failed to respond to any communication sent them on the ect. After our arrival here the committee now present, a thorough discussion of the matter, have decided to pre- two reports, and I will now proceed to read those two rts.

e President—I will say, under our rules, the minority rt must be presented first.

r. Caffrey—In accordance therewith, Mr. President, I will read the minority report, which is as follows:

MINORITY REPORT.

ac Roadmasters' Association of America:

e undersigned, a minority of the Committee on Standard Track ts, submit the following report: That we still adhere to all the mmendations for a standard joint named in the report submit- t the Cleveland meeting in 1887; and we further say that it is pinion and belief that a suspended joint having all the qualities named in that report, and in addition to be from 28 to 30 inches in length and having six bolts, has all the essential features required for a standard track joint, and herewith submit blue prints of a section and side elevation of what we hereby recommend for a standard track joint.

R. CAFFREY,
H. D. HANOVER.

I will now read the report of the majority of the Committee on Standard Track Joints, which is as follows:

MAJORITY REPORT.

The undersigned, a majority of the Committee on Standard Track Joints, beg leave to submit the following report: That the best device now known to them for a standard joint is the angle bar. That this angle bar should be from 42 to 44 inches in length, with slots for spikes 2 and 6 inches from the ends, with six bolt holes, spaced from 6 to 7 inches apart, resting on three ties, 9x7 inches and 8 inches apart, weight 60 pounds per pair for a 60-pound rail, and increased proportionately for increased weight of rail, shaped to conform to the head and flange of the rail, allowing about 1/16 inch space between the splice and the web of the rail, to permit of tightening. The cross section of joint shown by figure 6, page 28, of annual report for 1887, meets our views as to shape and fit. The bolt holes in both plates should be oblong in form, and round or button head bolts, elongated under the head to fit the oblong hole in the plate be used. For rails weighing from 60 to 70 pounds per yard a splice bolt ¾ of an inch in diameter with a square nut of the proper size should be used when practicable; and for rails weighing over 70 pounds per yard a bolt ⅞ of an inch in diameter of the same form should be used, and a metal washer or spring should be used between the nut and the plate. As far as we now know we are in favor of giving the angle bar, made heavy in the center and tapered towards the ends, a more extended trial before deciding on its merits over one of a uniform thickness throughout. That we decidedly prefer a supported joint to what is generally known as a suspended joint.

P. NOLAN,
A. B. ADAMS,
T. HICKEY.

The President—You have heard the minority and majority reports of the Committee on Standard Joints! What is your pleasure with the minority report? We will act on that first.

Mr. H. W. Reed—S., F. & W.—I move that the majority report be received for discussion. Seconded by Mr. James Sloan, C. & E. I. Ry., and carried.

The President—The question is now open for discussion.

Mr. Caffrey—I would ask if the minority report by this ac- n is rejected?

Mr. Burnett, Vice-President, (in conference with the Presi- nt)—We will advise you directly; we are looking the matter (After a conference with the President.) In order to ng the matter up for discussion I understand a motion must made to substitute the minority report for the majority re- t and then discuss it.

The President—That you may all understand fully how this o be disposed of I will say that the minority report is up w for discussion and whenever the discussion is exhausted will take up the majority report and then the two reports ll be before the convention for adoption: either one or the er. We will be pleased to hear from any gentleman on the or on the minority report. Do not let anyone hesitate to give views. I wish everyone to say something on the subject; you say nothing about these reports it would indicate you ew nothing about them, and I know that is not so.

Mr. W. H. Courtney—L. S. & M. S. R. R.—I think the length he angle splice adopted by either committee is too short for a ble track road. I think it should be 4 feet long. On a double ck road those who have worked on them are familiar with fact that one of the greatest difficulties is to keep the rail m creeping. and in order to do that he must tie the rail h three ties, and in order to prevent the bunching of the they should be bolted on. I would be in favor of using a el splice about 42 lbs. in weight. I have a blue print that resents it as I have explained.

W. Burgdorf—Union Pacific—We have suspended joint l other kinds on our roads. My preference is a 36-inch le bar, yet the 42-inch angle bar, I think, gives us better isfaction. The objection to the 42-inch angle bar is, how ll we get around the curve?

Mr. John Sloan—Bend it!

Mr. Burgdorf—A 42-inch angle bar covering three ties with r bolts would suit me.

W. H. Courtney—L. S. & M. S. R. R.—The joint I refer to cost this year $1.69 complete. We have used this season 17,000 of

those and after four years have never found any difficul-
The splice adapts itself to the curve.

W. L. Swinney—W., St. L. & P. R. R.—We have some of th
joints in the track, but I have never had any experience wi
a long angle bar, yet I am in favor of the majority report as
the support of the joint. I believe a tie under the joint mak
a much better joint than a suspended joint, even if there
only a 22-inch angle splice, or a 48-inch one. We have nev
used the long angle bars referred to.

The President—I think we have several members here w
have had experience with them. We would like to hear fr
Mr. Hickey.

Mr. T. Hickey—M. C. R. R.—We have used the 44-inch ang
bar for about four years. We use six bolts and the splices a
slotted three times and give good satisfaction. My experien
at first was that they were too light, and a number of the
broke in the centre, but the splice we are now using is mu
heavier and I think will not break. I would recommend th
to be the best track splice I know of. The 44-inch bar, I thi
makes a very good splice. They are 65 pounds to the tie, a sin
splice about $1\frac{1}{2}$ inches from the centre. I think it would be a go
plan to splice it on three ties. We are using our 44-inch an
bars on broken joints. We slot the angle bar for the cen-
tie. I think it tends to weaken the splice, and some of th
have broken. Those that did break, and they were the ligh
ones, broke from the top. I think the centre tie should
spliced on the slot, and then your shoulder tie would co
right up against your joint tie and be together solid.

The President—Mr. Hickey, I will state, is a member of t
majority committee. Gentlemen will also find here the bl
print accompanying the report advocated by the minority co
mittee.

(The blue print was examined by members and explained
Mr. Caffrey, chairman of the minority committee.)

Mr. Richard Caffrey—Lehigh Valley—These ties only ha
8-inch faces. The distance between the bearing surface is
inches. The distance from the end of the rail to the first hole is
inches on each rail, or, strictly speaking, it is 1 $\frac{15}{16}$ inches, t
$\frac{1}{16}$ inch left for play. The distance from the first middle hole

one side to the second is 4 inches; also the distance from the second bolt (shown on the diagram) to the one nearest the end is 5 inches. The reason for placing those at different distances apart is to allow the spikes to be broken without interfering with the ends, as you will observe where there is a place for a spike (showing on the diagram) the end of the same is placed far enough so as not to interfere with the nut in turning. The extreme length of the plate is 30 inches. I think the spike would be equally as effective at 28 inches. the object in making it 30 inches being to give a more definite place to drive the spikes in the slot at the end to prevent the creeping of the rails. The distance between the slots is 22 inches. The angle bar weighs 56 pounds before the place for the bolts are punched out, 28 pounds to the plate. The punchings are a little over a pound in weight. The nut lock, represented here, does not necessarily go with the joint. The weight of the angle bar is 28 pounds for 30 inches, before the blanks are punched out—28 pounds to a plate.

Secretary Reed—Your angle bar has more material in the flange than the angle bar proposed by the majority report.

Mr. Caffrey—Yes, sir; it has more bearing surface under the head of the rail, and is also stronger at other points, yet under the head of the rail, where it has a tendency to work vertically, there is a weak point, and that is the reason for placing those centre holes so near the end of the rail, to prevent this strain.

The President—There are some members present who have long angle bars, and I should like to hear from them.

J. H. Linsley—C., B. & Q. R. R.—I have had some experience with every device gotten up. I have experimented with most everything, and never found one that was perfect. There are objections to every device I have seen yet, and I have found the ones giving the best satisfaction are those that are taken the best care of. The objection to the long light angle bar with six bolts is that if it is screwed up properly it creates so much friction that it forces contraction and expansion. With the square joint I have had good results when taken good care of, but I see no necessity for as long an angle bar as 40 or 44 inches. I do not see where we derive any advantage after we get a certain distance from the joint, and I would be more in favor of enlarging the angle bar the ordinary length that we use than to lengthen it. We have both suspended joint and joint on the tie, and the rail at the head of the joint is the one that gets the blow.

The President—Which one are you advocating?

Mr. Linsley—I am not advocating either: I want you to take your choice. I have produced good results from both, but the best from the one I have taken the best care of. My impression is that with a suspended joint well taken care of the blow is not so heavy on that joint as with the tie directly under the joint, consequently I am not very particular which one you adopt. I have had good results from both.

The President—Which would you vote for, a suspended joint or the one on the tie?

Mr. Linsley—I will see what the argument is from this on.

Mr. Ramsey, J. P.—C. H. & D. R. R.—On the C. H. & D. R. R. we have a 24-inch angle bar with the slot in the centre, and if the joint is kept well up that does very good work and if the joint gets down it will be broken on account of the slot being in the centre. As I understand it the 44-inch angle bar may be used with the slots at the end.

Mr. Wm. F. Ellis—Providence & Worcester—I would ask Mr. Ramsey whether the breakage of the angle bar does not begin at the top?

Mr. Ramsey—It is similar in all respects to the regular suspended joint, only the slot is at the centre instead of at the end and the crack begins at the bottom where the fibre of the bar is cut, which leaves a corner in the material which starts the crack where the strain is the greatest.

Mr. Courtney, W. H.—L. S. & M. S. Ry.—I will state that my experience is that I have never seen an angle bar begin to fracture at the bottom, but invariably at the top, therefore I think that slotting the angle bar in the centre has no effect on the plate.

Mr. H. W. Reed—S., F. & W. Ry.—I have read carefully the reports of both the minority and majority of the committee and it seems to me that in some of the practical details the differences between them are very small. The minority of the committee report a form of bar which has more material in the flanges at the top and bottom, an important feature, particularly where it is used as a suspended joint. As this is a thorough scientific construction I feel like concurring with the minority report. I notice that another essential point of difference in the two reports is the length of the angle bars, and in that I must confess I have not had sufficient experience to decide. We are making tests now on the road with which I am connected with a view of determining which is the best, a long angle bar supported on three ties, one in the centre or a a short angle bar suspended between two ties. In reference to the slot at the centre of the plate I have never noticed an angle plate start to break at the bottom. My experience is that the fracture begins at the top. The form of plate referred to by the minority report we have in use on our road on 175 miles of track or more and I do not think in three years service we have had one dozen broken angle bars, so that my inclination is toward that form of angle bar.

Another point in the report of the minority which is important, I think, is placing the bolts so close to the end of the rail. I think that is a valuable suggestion that would probably result in greater resistance to the tendency of depression at the joint. The short bar has one argument in its favor in the remark of a gentleman made here a few minutes ago when he stated that with the long bars the friction between plates and rail is so great as to prevent expansion. I have had that happen in my experience and for that reason I prefer the form of plate advocated by the minority.

Mr. Lindsey—Don't you think the oblong hole should be in the rail instead of the splice bar?

Mr. Reed—I think not, but I cannot state from experience.

Mr. Adams, A. B.—W., St. L. & P. R. R.—Mr. President: I have had a little experience with those 44-inch angle bars and find they made a very nice joint. I have had, and am using now, about two miles of 34-inch angle bars slotted at the ends with three ties. That is the best and most solid joint on my track. Ours is a 26-inch angle bar. suspended joint. For two or three years they do first rate and after that there is too much spring in the joint, many of them are slightly bent, the ends are held down like a low joint, many of them are crack from the top down about to the angle and are flattened on t by the nipping motion of the rails. We are using the Veron a good nut lock. but this trouble will occur and in some cases have taken off angle bars and put on new ones. I am satisfi that the angle bar from 40 to 44 inches in length with the directly under the rail joint is the best joint I know of, eith for a broken or square joint. I would also recommend an ev joint. However, on a new road I would not recommend it, the reason that it is almost impossible to keep the rails squa My experience is that a suspended joint with heavy engin and traffic is not the thing.

Mr. Wm. F. Ellis—Providence & Worcester—Those 26-in angle bars that break, are they of the same thickness?

Mr. Adams—Yes, sir.

Mr. Burgdorf—Union Pacific—Our angle bars break do from the top. I have had much trouble and have had to ta many out. I am in favor of a long angle bar without a slot the centre.

The President—Mr. Adams is a member of the majority, a the next man we should like to hear from is Mr. P. Nolan the C., N. O. & T. P. R. R.

Mr. P. Nolan—C., N. O. & T. P.—In recommending the lo angle bar we consider it necessary to have six bolts with a under the ends of the rails. The increase of the traffic mak it necessary to have that added to the joint. With the slots the centre I think the angle bar is weakened very much. Th break underneath. Many used as a suspended joint crack at the top; there was a lack of support there. We are usin 24-inch angle bar, suspended joint: it is not at all equal to requirements, however, as my judgment goes. We use pound rail. 4½ inches high. The feature of contraction a expansion makes the trouble if you tighten up the bolts a the friction will be too great for the rails to move. I loosen the bolts in order to allow the rails to move.

The President—Have you ever had any experience with long angle bar?

Mr. Nolan—No, sir: only from what I have seen on ot lines. I do not believe it is what we need. I do not see necessity of having it any longer than 42 or 44 inches. I should like to have the ties 8 inches apart; I think that is far enough apart.

Mr. Isaac Burnett—Joliet Steel Works—That being your suspended joint, you will find this trouble in raising the joint by section labor, in the raising and tamping the tie: the ties tamp well, the joint is raised and is undoubtedly tamped more firmly than the other one not raised up and you will find that you get a different bearing under that quarter of the bar and thus one side will be a little lower than the other.

Mr. Nolan—No, sir. Our method of raising the joint is to put the least amount possible under the joint. We use slag and stone for our ballast, and use the smallest amount possible and that trouble cannot occur. We do not tamp the tie while the jack is under the rail, only put enough under to hold it in position, and tamp it first and the two joint ties are tamped afterward.

Mr. Burnett—In gravel track it is tamped afterward. Do you find that trouble, Mr. Caffrey?

Mr. Caffrey—Not that I am aware of.

Mr. Nolan—This cannot occur with our method of raising joints. After the jack is taken out we tamp the joint.

Mr. James Sloan—C. & E. I. Ry.—Mr. President: I am not posted on the long angle bar, although I have some road to put in when I get back with angle bars 44 inches long. However I have never used one yet.

Mr. Wm. F. Ellis—Providence and Worcester—Mr. Hickey. I would like to ask you if on a grade on your road you have any trouble from the ties getting zig zag opposite the joint on a double track road?

Mr. Hickey—M. C. R. R.—None whatever.

Mr. Ellis—I refer to this, you have your angle bar opposite the middle of the rail, the three joint ties at the opposite ends have no slots in the rail to hold them from getting twisted around, on a grade, I mean, on a double track road?

Mr. Hickey—Yes, sir, I understand, we have used them there. We have had them in use for two years and I do not think the rails have crept an inch in any place, and those joints are on three ties with broken joints. We have more trouble

[illegible] we do not think I have had exp
long splice to give an opinion. We use
have for two or three years, yet are
express an opinion. During the last
have replaced the old style with the
same, only the weight is taken out of th
fess that between the short splice and l
decide which is better. I notice with
holes that right at the joint there is a t
itself and whether that is due to the f
iron I do not know. It seems to me th
are omitting in this discussion is the fa
a steel splice while others have an iron
port of the committee should specify the
in the splice. For my part I am decide
the material should be of steel. I thi
with a suspended joint will give better sa
iron splice, yet I think at this time
definitely on the best splice. While o
considerable with the 42 and 44-inch spli
roads that use the short splice with go
am not yet satisfied whether it shoul
short splice. I know the splice we are u
than we formerly had, but I cannot
opinion, although I hope in the

satisfactory, but we do not use the suspended joint. We use the three ties with suspended joint. With the six bolted bar we never found much trouble in contraction and expansion. We have tried two kinds of bars and like the longer one, not over 36 inches, and I do not see where we get the benefit of a 40 or 42-inch bar. We use a 6 by 8 tie, 8 inches wide and 6 inches thick, and the space between the ties is 20 inches from centre to centre.

Mr. Reed—What difference in form and weight is there between the short and long angle bar, did you say?

Mr. Black—The short bar, the 24-inch bar, weighed 24 pounds; the 36-inch bar, 42 pounds. I also used, which you gentlemen no doubt have used, the Samson angle bar, and found them very unsatisfactory. They were a 24-inch bar with four holes. We have now three miles of the improved style of the Fisher joint, the suspended, or bridge joint, that has to be suspended for this reason. You cannot get a tie direct to the end of the rail. We have also had an experience with the bias cut rail (laughter), and we find after two years' service we have to throw the rail away because the joints are all pounded to pieces. There is no support for the head of the rail.

Mr. Caffrey—That would not be the case if you had a good angle bar.

Mr. Black—No. And that you do not get with the Fisher joint. Along with the square joint, the Fisher bar has given good results, provided you understand that the plate is well laid on to the tie and kept up; if the tie is not kept up you will have a bad joint. However, with the improved Fisher joint, we find very good results, and I should like to hear from some gentlemen who have used the Fisher joint; that is, who have used it on the ground instead of elevated, as in my case.

Mr. Jas. Sloan—What space between the ties?

Mr. Black—Ten inches, and three ties. We leave the tie to act upon the end of the angle bar; it does not extend across the tie.

Mr. Caffrey—I should like to hear the cause of the failure of the Samson angle bar of which you made mention?

Mr. Black—Well, we first laid the Samson angle bar on the

joint. We have difficulty to get a go
the air, and the least noise is like a bel
a bell, continuously.

Mr. Patch. J. K.—Con. River.—Don
so many broken bars come by reason of
taken care of?

Mr. Black—The bars there must be
reason that we have a solid foundatio
lies on the girder, and along with tha
securing the tie; and, another thing, w
which causes many joints to break, an
kept tight, and the tighter they are ke
too.

Mr. Patch—I must say a word on
cause so much has been said of broke
understand it: I do not know what th
use on the Connecticut River Railroad
which weighs 38 pounds to the bar, all
joint, square joint, and there never has
taken out of our track since put in, yo
cracked to-day, or one angle plate that I
down. That is all I can say.

The President—That is saying a good

Mr. King—What is the weight of you

locomotive or a 50-pound rail without gravel or stone bal- ? (Laughter.)

r. Patch—No, sir ; we have none of that kind.

r. Jas. Sloan—I have taken out between seven and eight sand Samson angle bars, broken through the first bolt , and have good gravel ballast. They weigh 26 pounds, 13 ıds apiece. They fit close to the web of the rail.

r. O. F. Jordan—Michigan Central—I do not know that I e had experience enough with the suspended joint to offer opinion with the long splice. I have had them in use be- en four and five years. They are 44 inches long and use e ties, all spiked, and so far, I think, it is the best joint I e ever used, but I have used the suspended joint but little.

r. Isaac Burnett—Superintendent of the Joliet Steel Works he gentlemen are all talking about the joint, and what is a t? It is two rails joined together and then comes the joint ning afterwards. They talk of the angle bar and say ing of the weight of the rail, nothing of the tonnage and ic over the rails and over the joints, and can anyone offer ntelligent opinion without the whole matter is discussed? hat as it may, I would surely say never defend a heavy e bar to justify the use of light weight rails.

r. Houghton—W., St. L. & P. R. R.—Is there any trouble orking an angle bar lighter at the ends than the centre ?

r. Burnett—I am told by the Milwaukee people that roll a for the Milwaukee road that they do have trouble in get- them straight, but that does not cost the railroad company thing, they deliver you a straight bar and they roll many em. That is the bar represented there. (Showing on blue t.) I have gone over something like thirty miles of track hand car on the Milwaukee Road, personally, with a view eing and knowing their condition, and that was after three s wear, and I found that where they had a suspended joint 60, 65 and 67-pound rails, laid in 1883, 1884 and 1885, it fe to say that 40 per cent. of the joints are dipped more or I saw five miles of track, laid in 1883, claimed to be y pounded out of joint. In 1885 taken off and this angle ut on. I was over that track this year and was assured he Roadmasters that the dipping that existed in the joint when the short bars were taken off in 1885 had almost entirely disappeared. Fifteen per cent. of all the short bars on the Milwaukee Road are cracked or broken and that with good gravel ballast, or coke in other places and gravel and coke in others they moved the tie directly under the joint.

Now, the six-hole question. When Mr. Clark (who is now dead), who was General Superintendent of the Milwaukee Road, when he commenced using this bar had it punched to fit the old rails, consequently when he got the new rails he had the drillings made for six bolts. He said, however, that if it had not been to accommodate the bar to their old drillings he should never have used the four bolts. Many of them now run on the old drillings and have but four bolts in. Their 67-pound rails were, of course, not bent at the ends as badly as the 60-pound. Where the long bar was used he saw no advantage in it as it preserved the head of the rail from flattening. Neither do I think you can put anything under the head to keep it from flattening if loaded beyond the elastic limit. Something must give way by reason of the enormous traffic, and something must be considered besides simply the question of the angle bar. Why? Ten years ago our engines weighed but 30 to 36 tons, to-day they weigh from 50 to 70 tons. The Pullman palace car weighs 80,000 pounds. I came over the Pennsylvania Road and there were five of them in the train equal to drawing four locomotives hitched together ten years ago. To-day a very common passenger coach weighs 70,000 pounds. To-day a fruit car has from 35 to 40 tons in it, and the speed is increasing equally with the traffic and until you can get a rail that has the vitality to resist the load the joint question will be agitated, and when you get that you will not have much more trouble with them.

There is no value in the angle bar after you are six inches from the end and I would rather not have this bar come to the top of the rail at the end anyway. That represents 75-pound rail. (Showing.) I saw some of that track laid and it was fine, as nice a joint as you ever saw. I went over 200 miles of the Chicago & Alton Road. They had a 70-pound rail in 1881 and nothing lighter than that since, from 82 to 84-pound rails with suspended joint, and now they use a long angle bar, 42-

ch and a supported joint. They have an enormous joint. In eir case "the tail wags the dog." I was over the Michigan ntral Road and they have the suspended and supported nts laying directly opposite one another and the creeping of e suspended joint is continuous, and the flattening to where ey have their long angle bar.

Mr. Lovell—Penn. Road—I have here a communication ich I would like to have the Secretary read, and would ve a suspension of the rules for that purpose.

Motion put and carried, and the Secretary read the following:

"The President of the United States desires me to say that will be pleased to give a special reception to the roadmasters, eir ladies and friends at half-past one to-morrow, Wednesday.

GEO. S. BIGELOW."

Mr. Lovell—I would move that we offer a resolution accepting the courtesy and thanking the President for his kind invitation.

Motion seconded, put, and carried unanimously.

Mr. G. E. Cain—Wabash Road—I have examined much of the territory this spring that I am connected with and find several broken angle bars, but no new broken ones, only those that have been used for a time. I notice in raising the joint it cracks the angle bar. Now, if a low joint will break the angle bar, why will it not break at the bottom instead of at the top?

Mr. Burnett—I have never stood by to see a rail break, but have seen more cracked from the top than the bottom.

Mr. Cain—What was the cause, did you think? The creeping, rolling, waving motion?

Mr. Burnett—If the joint is bent it will come down, the plate will be bent and will crack from the top down.

Mr. Cain—I have had them break right in the joint.

Mr. Burnett—That is caused by poor track. [Laughter.]

Mr. Cain—W., St. L. & P. R. R.—Many break from the head down. You all talk of the long angle bar, and do not speak of the quality of the material. In case of all the angle bars we have had break of the 26-inch and suspended joint whereever they have broken there has been too much space between

properly placed we have no broken ang
them they are not of good material, t
iron and such material, and they hai
and nine out of ten are of bad materia
all of that material in that long angl
36-inch angle bar, with six or eight in
you can hold your joint, made of steel,
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should speak of the size of your rail, :
traffic, wherever we keep up with the tr
no trouble with them. If you have a
short angle bar weighing but 28 pounds
the trouble, but not then if the joint is
not in favor of anything longer than a
put the same material in as you would
bar, by giving it a proper space betw
eight nor less than six inches. The six
to tamp. We have some six inches bet
broken angle bars, either.

C. H. Cornell—C M. & St. P.—I am
bar. I do not know that all of this
regard to the angle bar. However, I th
good support to the joint the angle bar
great figure. They say "Old things are

The President—What you would consider a good splice on a curve would not be considered good on a tangent.

Mr. Cornell—If you had a mud track I think I would rather have a square joint. I am in favor of a tie under the joint, with a 24-inch angle bar. I find my rails battering, and it is a pretty hard matter to keep a battered joint up.

The President—When you let it get down.

Mr. Cornell—It will come down, sure enough, if the joint is pounded. [Laughter.]

Mr. Cain—I want to go on record as favoring a square joint.

Mr. Burgwin—G. R. & I. R. R.—One-sixth of all the broken steel rails we have taken out on 140 miles of track was caused by the weakening of the rails by the punching of holes in them. We have a 56-pound rail over nearly all, some of it a 50-pound rail, and the engines run up to 45 tons.

Mr. Caffrey—Were the holes punched or drilled?

Mr. Burgwin—They were punched.

Mr. Caffrey—That accounts for their breaking in such large numbers. I think the position of the bolt and tie has nothing to do with the breaking of the rail. Do you attribute the cause of the breaking to the position of the hole and the tie?

Mr. Burgwin—Partly, and partly to the weakening of the rail.

Mr. Caffrey—I have thought the breaking was largely due to the fact that the holes were punched.

Mr. Burnett—What year were the rails made you thought were punched?

Mr. Burgwin—They were made in 1882, those that broke the most. The Cambria Steel Company made them, steel rails.

Mr. Burnett—Then they were not punched.

Mr. Ellis—I have only a short road. I have been there as Roadmaster some ten years, so that my knowledge may not be as good as that of many who are present, but we have a good traffic over our road. When I went on the road we used a common fish-plate. I had good ballast of gravel, yet I found many of the rails crippled at the joint. There was in use on the road a square supported joint, and when there came up a question about the renewal of some of the steel rail I found I had to carry some track that had crippled steel. I then asked them to order an outside fish-plate seven-eighths of an inch thick for that steel, and that steel had been in use some thirteen years. I put on that outside fish-plate just before it froze up and shimmed the joints during the winter endeavoring to carry that steel rail crippled at the joint a year. I carried it two years. So much for adding on a heavier plate. In 1885 we changed to a 72-pound rail for all steel to be used, and to the angle bar, and that angle bar is here represented (showing) as you will see on the print, 23 inches long, the two weighing 44 pounds. The inside angle bar is five-eighths of an inch thick at the bolt hole, and seven-eighths of an inch thick at the bearing for the rail; the outside angle bar is seven-eighths of an inch thick at the bolt hole and 1¼ inches thick at the bearing for the rail.

The foot of my angle bar extends out 1⅜ inches from the edge of the base of the rail for this reason, I wished to have some iron on the outside of my slot holes—(I have no grades to speak of, 28 feet to the mile is my heaviest grade)—the foot of the angle bar is $\frac{1}{16}$ of an inch above the level of the base of the rail, and I place the slots in the outside angle bar nearer the joint than I do those in the inside angle bar, for on my road I run many short dumps and have a coal branch where we do a good business, and some of the freight trains run from 15 to 55 miles an hour, often with a string of 50 long cars, and I can say this in regard to my angle bar, that I never had one broke yet! I adopted this style of angle bar in 1885. My road befo that had a square supported joint. We laid a portion of trac one Sunday in November in 1885 with the new steel and ang bar, where I have some 50 trains daily, and we were able t next week to put in joint ties and to tamp those joints so lai with a square joint suspended, and the next Sunday I laid t track directly opposite with a suspended broken joint. rained three days and froze up and there was no tamping d to the broken joint. We have found our experience to be, these two tracks laid thus, in favor of the broken joint. then I have laid the broken joint, but I can say to-day t have a 60-pound square supported joint that is a good track at a part of the road where there are not so many

About the long angle bar, I will say I have had no experience. My road is very peculiar. There are so many stations that trains must run rapidly between stations. I have three straight lines of a mile to a mile and a half, and the rest of the road is not straight but curved, and I do not think that a 44-inch angle bar would make as good a riding track as a shorter bar, on account of the sharp curves.

In regard to the steel angle bar, I have had none in use, but can say that I have some steel rail that had been in use thirteen years that I took out of the track with a light steel splice, and that that steel splice was not worn at the joint where the blow of the wheel strikes it in a double track, while on some steel where we had the iron splice I found them all worn on the side that the blow of the wheel came, for which reason I asked for a steel angle bar for my road, but have not as yet received it.

Mr. Kerwin—C. & N. W. R. R.—Did you re-tie the steel you laid on the square joint or broken joint?

Mr. Ellis—I laid the square joint the first Sunday and upon one-half mile of that we were unable to get joint ties under the joints laid. Under the broken joints there were no joint ties put in until the next spring. I have always on hand shims for my foreman to use and there were shims under all those joints. In regard to that track laid, one broken and one square, I can say to-day, if you look at the surface of that rail. the broken joint shows up the best.

Mr. Lovell—Penn. R. R.—We are now upon the discussion of different lengths of angle bars and it seems to me that if we decide this question at this time we will make a mistake. The length of the angle bar has been mentioned as 26, 36 and 42 inches, etc., and it all depends upon the spacing of your ties. Several years ago I went on to the West Shore Road, where these long splices were used, and the foreman there told me that the difficulty was that the ties were unevenly spaced. Now we should bear in mind this thing, that the length of the splice is governed by the spacing of the cross ties. Another thing, I think the test has been made of the long splice on new roads under favorable circumstances. These tests have been made within the last four years and that has not been a sufficient length of time to enable us to get a fair test. New rails with new splice is not a good test. They should be put on old rail with four or five years' experience, that is the proper place to make a test. We should not under such circumstances at this time put ourselves on record as defending any particular length that will be in proportion to the number of cross ties used to the 30-foot rail. Mr. Cornell, of the Lake Shore Road, advocates a certain length, a 48-inch splice, and he advocates it because he finds it necessary. Now your ties should be placed uniformly and supported uniformly, and if we adopt a 42 or a 48-inch splice we must place our ties accordingly. Therefore it seems to me at this time we may be premature in deciding upon any definite length. I am not in favor of a long or a short splice, I wish to be convinced, I do not wish to jump at the conclusion too rapidly.

Mr. Ellis—In regard to the square joint versus broken joint the creeping of the track should be considered, and I must say that on the lower part of the road where I laid this rail first that my ties are a little zig-zag, the ties have moved a little around. Now on the N. Y. & N. E. Road there was a broken joint laid and in walking over the same I have seen the ties moved four inches out of a right angle, which means bad track, and that is why I am considering whether it is better for me to lay a broken joint even if my road is crooked. The Bost. & Alb. Road to overcome the same put on a little plate on the tie opposite the broken joint, which is a supported joint with one bolt there to keep the tie at right angles. Some roads are using the Bush bolt for the same purpose, which I like. The Bush bolt seems on our line to prevent the creeping of the track, especially on my bridges, where I do not allow a spike to be driven at the slot holes of angle bars.

Mr. R. Hyland—C. & M. R. R.—The angle bars we use are the same as Mr. Patch's, a 24-inch bar, and we lay them suspended joint. I am, however, as much in the dark as Mr. Patch about these broken angle bars. I have about two miles of track of the straight Fish bar, laid between 1876 and 1880, and have never had any broken Fish plates on that track which was laid with a supported joint. In 1882 I commenced to lay the angle bar with a 72-pound rail. The first we laid with a

orted joint and soon after with a suspended joint, and I
the suspended joint the best. and have had none broken.
ll the angle bars we have laid I have never yet found one
en. One gentleman spoke of the Fisher joint. I have about
iles laid with the single yoke Fisher joint, laid between 1876
1880; it is the same as their improved joint only not quite as
y. That has given us more trouble than the Fish bar, so
s breaking is concerned. It is not as heavy as the im-
ed joint. I put in during the past year about 1,000 of the
roved joints to take the place of the old ones broken and
it improves the track very much. My experience with it
hat the angle bar has given us better satisfaction than the
her joint.

he President—What length angle bar do you use?

r. Hyland—Thirty-eight-pound bar now, 24 inches long. I
k if I had used the improved Fisher joint in the first place
would have had better success with it, but I find, as our
d is a single track with a heavy traffic and our engines from
o 50 tons, passenger engines the same weight, with heavy
des, the Fisher joint in going down grades will come apart
I have not been able to prevent its creeping. We do not
e that trouble with the angle bar.

r. J. H. Preston—C. R. I. & P. R. R.—I think I am pretty
rly on record on this joint question from last year. I have
changed my mind any, I think, regarding the latter, and I
ld rather agree with the minority report of the committee,
ems to me. Some gentlemen remarked not long ago that
e were many things to take into consideration in discuss-
the question of joints and angle bars, not so much about
joint as the angle bar. I think, however, there are many
gs to be taken into consideration regarding the joint in a
road track. In the first place we have the railroad bed,
next the ballast, and then comes the ties and the kind of
erial the ties are composed of, whether soft or hard, the
ance we should place our ties apart, the manner in which
spike them, and then, I presume, would come the angle
, when we should consider the weight of our rail, the size of
bolts, the kind of washers and nut locks to use, and it

the joint, from the simple fact that I h
find an angle bar, fish-plate, or Sams
that I have ever tried that has been as
we know this, that until we discover so

Mr. Cain—I call the gentleman to o
the suspended joint. Mr. Preston y
majority report and enlarging upon th
report. (Laughter.)

Mr. Preston—That may be. I am
information. (Laughter.) It is about a
way, gentlemen (coughing), my voice is

Mr. Kerwin—Like the angle bar, no
[Laughter.]

Mr. Preston—Well, be that as it ma
our friend, Mr. Lovell, of the Pennsylva
a little while ago, that I hardly think a
at this convention is sufficiently informe
experience of his own personal knowled
ticular style of joint fastening to admit o
men, I know this to be the best." Now
dition; my mind is not made up positiv

The President—I would state for the
or other members for that matter, tha
raise this point is just before the vote

ve probably had on all of that about twelve to eighteen
cked angle bars, cracked at the top up under the base of the
ll of the rail. I have about 40 miles of a channel bar put
in 1878 with a wooden washer or nut fastener, and many of
ese have broken, caused by its being heavier at the top than
the bottom, I think, and not extending over the base of the
il far enough. With the suspended joint we have less trou-
e than with the square joint, and I think where properly
ken care of it is a much better joint. Our grades extend
m 10 to 90 feet to the mile, and our curves from 1 degree to
On one division of 140 miles we have all square joints
th curved and straight tracks. I find where the track is
ll ballasted and kept in good surface we have not as much
uble with the suspended joint as with the square joint, and
my own use I would not ask a longer angle bar than 26
hes. Also on the same road we have dirt track. We have
o gravel and sandy track and have no more trouble with the
t track than with the other, only we have to keep a square
nt on the dirt track. The 24-degree curve I spoke of is on
main line.

Mr. Mandeville—Lehigh Valley R. R.—I do not know that
an enlighten you much. I have had no experience with
ce joints longer than 30 inches. When we talk of joints on
track, I think we should not hesitate to drop either one,
ld it be advisable, because I think every move made in
ast ten years has been a decided improvement, commenc-
vay back to the old cast iron joint, and from that down to
wo bolts or four bolted Trenton chair with the nuts eter-
falling off. Again, I think I can safely say that of all
nts I have used and am using on the Hazleton division
Lehigh Valley Railroad, I know this 36-inch angle bar
ecided improvement over, and I think we have got it
perfect, yet we may find something still better. If I
the railroad business I should try one still longer, I
et the time may not have yet arrived to decide. I
y a 76-pound steel rail, with a 36-inch angle bar, and
broken joints, altogether I like it on our curved roads
ter, and I think I can see on a long straight road that
rves with a broken joint would be objectionable;

whereas, if you have good springs it is different, but that with from 16 to 18 degree curves. Regarding the running some passenger trains on a 210-foot grade, there the maint nance of a square joint would be out of the question; therefo I am in favor of a broken joint, a "suspended joint" you m call it. Regarding the creeping of the track, I have not y been able to overcome that. I have made use of spikes a bolts in every way, but they will move around. We spike o ties in a line.

Mr. Ellis—With a short angle bar, six inches space betwe the ties, as I have them with my 23-inch angle bar, I have little uneven space which I do consider a detriment.

Mr. Mandeville—I consider this 36-inch angle bar with s bolts to the joint a decided improvement over the old one, the splice with the bolts two inches from the end obviates t rolling of the rail, more so than the former joint.

Mr. Ellis—The former joint was longer between the cent bolts?

Mr. Mandeville—Yes, sir.

Mr. Ellis—Another thing I would speak of, which may be favor of the long angle bar with a tie under the joint. We s have broken rails, and my experience has been that seve eighths of them break at the bolt hole, the fracture being fro the head of the base of the rail, so that the less bolt holes the the better it is for the rail when it becomes crippled at t joint, and in cases of breakage a tie under the bolt holes whe it occurs is of great benefit. With my suspended joints t angle bars have the bolt holes 5 and 5½ inches apart, so th they may be supported by the ties under the same.

Mr. Lovell—I move that this subject be re-committed to t committee.

The President—I do not think it is a proper disposition make of this subject. There are quite a number of delegat present who have spoken and who have not spoken, and n when we hear from all and get through with the discussi then let us decide. There are many here who may wish speak, and we certainly desire to hear from them if they do say more than half a dozen words. I am endeavoring to every member's views on the subject. Let us hear what ev one has to say this year so that when it comes to the next meeting we will have the views of every one present.

Mr. Lovell—In making the motion I felt that we were not prepared to decide this question now; I could listen to this discussion after supper, yet I do not think we should decide it at this meeting.

The President—When we put it to vote it is well to bring up the remarks you are making.

Mr. Lovell—I cannot vote on this question because I am undecided. There are many others in the same condition. We should decide this question unanimously.

The President—When we are through with the discussion of this question, understand, you may have the floor to make those remarks; now you are cutting us off, while I wish every member of this Association present to be heard on this subject. If we cannot dispose of this question satisfactorily at this meeting we will carry it over.

Mr. Lovell—I withdraw my motion.

Mr. Burnett—It is now 6 o'clock and I would move that we adjourn until some time this evening, if we wish to hold an evening session. (Not seconded.)

The President—It is the understanding, I think, Mr. Burnett, that we will continue until about 7 o'clock and then adjourn until 8 o'clock, and thus get along with our work as rapidly as possible, as the weather is so bad we might as well dispose of our work now and take up our visiting afterwards.

Mr. O. F. Jordan—M. C. R. R.—We have the suspended joint and out of 60 miles of road I will say we have had but one rail broken.

Mr. Hickey—M. C. R. R.—I use them on all curves exceeding three degrees. I bolt the rails together on the end of the ties to correspond to the curve they are to go on. I think all rails should be curved for a three-degree curve or over. The rail will stay in line and there will be no trouble with the splice.

Mr. C. H. Stockwell—C., M. & St. P.—The division I am on was laid with suspended joint, 24-inch angle bar. We find that there are many rails battered, the angle bar breaking, and we are replacing them with the 42-inch angle bar, and we think hat this is an improvement. It holds the joint better tha the short suspended joint.

Mr. D. McCarthy—J., T. & K. W. R. R.—I have some sho and some long angle bars, but the latter are only 36 inche long, and the short ones 24 inches long, and I prefer the lon ones, but would not have them longer than 36 inches, from th fact that putting them on a sharp curve leaves a tangent in th joint. I have seen this on the Missouri Pacific, where they ar being rejected, and they are putting in the 36-inch angle bar with four holes and three ties under the angle bar, which I consider the best joint. I have been using them about a year, an the weight of rail is 67 pounds to the yard. They are 8 inche apart. I intend to have them that width. They give goo satisfaction. I would not have an angle bar longer than tha

Mr. M. H. Stearns—C. & N. W. R. R.—I had unpleasant experience last winter with broken rails, when we averaged 70 or 80 broken rails in each month. This was on suspended joint and 22-inch angle bars and ties 8 or 9 inches apart. Some of the steel was 11, 12 and 13 years old. I found the breaks were usually through the first bolt hole, and then the wheels passing over the track it again broke through the second bolt hole, which made us feel very glad that we didn't have a third bolt hole. Last spring the Chief Engineer said the Roadmasters had condemned the 34-inch angle bar and I immediately walked over about 20 miles of my track and did not find one broken angle bar. The division beyond me had several hundred angle bars of this length, which convinced me that the breaking of the angle bars was caused by the centre of the tie not being thoroughly tamped up. I find also that the Samson bar gives more elasticity, there is more spring, which I think is another good feature, and it seems to me that the duties of the angle bar are three-fold, and the angle bar that can be made th cheapest and at the same time perform these three duties th best is the one we should recommend: First, to hold the joi in even surface with the balance of the rail; second, to kee the cap (?) from creeping out, which gives an opening for t joint in all cases to throw out a little, and another duty of t angle bar is to hold the rails together. It seems to me that t one duty that the length of the angle bar can perform is to k

om creeping. I think an angle bar 48 inches long costs too
h money.

think a bar 36 inches long is long enough—that is, long
gh to admit of a good tie under the joint and a splice of
ches, and then the angle bar gets one-half over the second
which is room enough to give a slot. I am opposed to hav-
it slotted in the middle, which makes a weakness. Still, I
k a bar 36 inches long, slotted at each end, is as good as
thing we can do to prevent the rail from creeping, which
ly, I think, is an impossibility.

do not think, again, that the rails in creeping pry the track
adly out of gauge. I have about a two-degree curve on a
de and passenger trains run fast down this grade. The rails
e laid in 1885. Now this outer rail has a round (?) head,
I do not see how we can prevent it; however, I went over
ast spring and found it of an actual even gauge all the way
nd.

Mr. Melville—Wabash—I can say nothing for the long angle
as I have had no experience. I have a short angle bar 16
22 inches in length; also a straight splice. We have the
pended joint and the supported joint. Our road bed was
with suspended joint and our rails bucked so that we
lly got an angle bar punched in the centre and made a sup-
ted joint. I have no use for a suspended joint, and do not
nk it safe with the traffic we have and the rail we have.
st of my rail is 52 pounds. Our road has some long angle
s and I believe it has the joint with the angle bar slotted at
ends for the outside ties, but I would not recommend slott-
the centre for this reason, that it breaks the arch. An
e bar is an arch, and by punching the slot in the centre
break the arch, and my experience is that an angle bar
a slot in the centre will cause it to be broken through the
from the bottom through. An angle bar not longer than
ches is a bar according to my idea, with a support in the
e, and long enough to catch our second or shoulder tie, to
or help hold our rails from creeping.

Thurston—C., St. P., M. & O.—I have some of the long
bars made in 65-pound steel, 34 inches long, I have been
g three years, with three ties under the joint, and for the

rest of my 65-pound steel I have 24-inch angle bars with su pended joint, and with some of my 24-inch angle bars I ha a plate 8 inches wide with the same length of angle bars. have had good success with those laid in 1884. On the lo angle bars I do not think they are quite long enough to get the joint as far as I would like to have them. I am in fav of a joint with solid support. Heretofore where we had a su pended joint I have tried when I had 56-pound steel on n level track to put in but few joint ties and leave the othe suspended and spike my tie, but I found with no slots in tl angle bar that the joint with a tie under it kept up with le work than where I had the suspended joint, and in the brea ing of my angle bars, I have had some of 60 pounds brok owing to the poor ballast; they would get down, and I laid t breaking of them to the fact that the two ties were insufficie to hold them, therefore I think the supported joint is the be and I prefer the long angle bar, 36 to 40 inches. I have fou where laid on a 3-degree curve that the track is in as good line at the joint as anywhere on the rest of the ra Another thing, laying track on a curve, I lay my rails broken track, which makes my ties come a little too close the centre of the rail, closer than if the angle bars were a lit longer, and that is why I would prefer a longer angle bar. M angle bars are 44 pounds to the pair and are 34 inches length. I should prefer them 38 to 42 inches long, althoug have never had any experience with sharp curves.

Jas. Sloan—If you laid those 34-inch angle bars on ties, the half of the tie it came on, would it not naturally turn t tie up?

Mr. Thurston—No: when the ties are new it does not stri the ties enough to have any bearing; they do not come do as low as the bottom of the tie. My instructions were to l it so that it would come across the tie.

Mr. Jas. Sloan—Where do you spike the slots in the ang bars?

Mr. Thurston—On the end: the slot is close to the end. the 34-inch angle bar I would not have space to spike a have room in the top if put clear across. They are not lo enough: I want a longer angle bar.

Mr. Jas. Sloan—The 44-inch bar reaches the whole tie.

Mr. Swinney—I move we now adjourn until 8 o'clock this evening.

Seconded and carried.

Evening Session.

TUESDAY EVENING, September 11.

The President—We were discussing standard track joints when we adjourned. I should like to hear from Mr. Kerwin, of the Chicago and Northwestern.

Mr. Kerwin—I think the proper joint is one tie under the joint, and the other two to correspond with the angle bar. (Shown on the blue print.) Something similar to the bar represented on the blue print. We have something like it in use. I also have an opportunity of knowing what this bar does because this track runs parallel with ours. Ours is a standard joint, and we have to raise it several times, while theirs stands perfectly solid. That is all I have to say.

Mr. Burnett—Mr. Patch made an assertion here that he ha not a cracked or broken angle bar and never saw one on hi road. He did not state what the weight of his rail was, wheth 60 or 80 pounds, but I learned from asking him that it was 70-pound rail, and, in addition to that, he says that his ti under the supported joint are as close as they can be, almo equal to two ties under one rail, while the other parties w represent the suspended joint have 8 to 12 inches. There is reason why this bar should not break with a foot of gra under the track. There has been considerable said in regar the number of ties. I do not see that that cuts any figu this joint question. They use about so many to the mile. bar should be long enough to cover three ties, space th you please, and make your bar long enough to cover the The matter of spacing the ties cuts no figure at all. can work with a 26-inch bar it is economy to do so, an lieve the metal in the bar after you pass 6 inches eith from the joint is of but little value. it is simply there to against the evil of the track traveling, as I unders ny roads use a short bar, 17, 18 or 20 inches in length, with pported joint, and get good results. The Boston & Albany one, and they have never used anything else, I believe, but supported joint. In this country I believe our trunk lines must have a heavier rail and supported joint.

Mr. Patch—I think Mr. Burnett misunderstood me in what I said to him. Our rail is a 66-pound rail.

Mr. Burnett—I understood you to say 70.

Mr. Cain—W., St. L. & P.—Speaking of the joint and the angle bar, take the 26-inch angle-bar and put the same amount of metal in it as in the 26-inch and suspend it on two ties and it is a positive preventive to its creeping. But about the metal I would say use a steel angle bar; some have used them and so state; but you have never increased the weight of the angle bar; it is but little larger now than with a 56-pound rail; it has only been said that the length has been increased.

Mr. Burnett—I beg your pardon, here is one ⅞ inch thick.

Mr. Cain—Yes; well, have it heavier in the centre.

Mr. Burnett—You have in the centre all you can use on your "L."

Mr. Cain—But you are making it of iron, not of steel.

Mr. Burnett—The people of this country have come to the age that they buy the best.

Mr. Cain—Yes, many roads are buying it, the Pennsylvania Road are making them.

Mr. Burnett—I beg your pardon.

Mr. Cain—I said the only one I ever saw.

Mr. Burnett—I have laid a good many myself.

Mr. Cain—And you laid them with a suspended joint, with about a 36-inch angle bar and your rail did not creep.

Mr. Burnett—Twenty-four inches long.

Mr. Cain—A suspended joint just the same.

Mr. Burnett—From the fact that I have always done that, I am thoroughly satisfied that I have been in error all my life.

Mr. Cain—Well, why do you not stop that kind of thing?

Mr. James Sloan—"Live and learn."

Mr. Burnett—I do not know. On the Rock Island Road I had to lay what they gave me.

Mr. Cain—You should have recommended it.

track at one end in one summer 16 fee
creep; it is true.

Mr. Cain—How does the rail creep w
there is the joint, and there is the tie
bar?

Mr. Burnett—I have pulled the track
man can hold the rails on a double track

**On motion of Mr. Kerwin it was vo
allowed more than five minutes time her**

**Mr. Cain—I know from four years' ex
has not crept to exceed one-half an in
joint and a 36-inch angle bar with from
tween the ties on gravel, dirt and rock.**

Mr. Burgdorf—Union Pacific—How is

Mr. Cain—The track is the same on a

**Mr. C. H. Cornell—C., M. & St. P. R. I
rail broken and you drill it and put on t
you put it on the tie?**

**Mr. Cain—I do not always do it. If t
space between the ties we let it alone; if
leave it; when it is off, put it on.**

Mr. Burnett—How many ties do you u

Mr. Cain—3,950 down to 3,000.

Mr. T. W. Barrett—L. & H. R. R.—W

anything longer than a 26 to 28-inch bar, but I prefer a 24-inch heavy bar, suspended joint.

Mr. Cornell—At the time of relaying the 64-pound steel, what additional in ballast did you use?

Mr. Barrett—None at all.

Mr. Ramsey—Do you attribute the fact of the rail not creeping to its being the suspended joint?

Mr. Barrett—Our rail before that was slotted about 14 inches from the end. We attributed the rail's not creeping to its being a stiffer rail and to the angle bar. The only objection I have to a three-tie joint is you get your three ties so close together that your centres are inclined to stay up better than your joint.

Mr. Houghton—Wabash, St. L. & P. R. R.—I have had no experience with the long 40-inch angle bar. My track is laid, nearly all, with suspended joint. I have one piece of track about five miles across a marsh relaid about a year ago with suspended joint and I find that with two ties to hold every joint they work both ways. Every train that goes over it takes it in the direction the train is going, therefore, from what I have learned of the long bar, I think the bar recommended by the majority of the committee is the best. It seems to me that no joint tie should be required to do any more than to support the joint. If you put a tie under the centre of the joint and spike it in the slot hole it has a double work to do, and it seems to me to be wrong, therefore I am in favor, from what I know of this, of the long joint.

Mr. McEntaffer—W. & L. E. R. R.—I would state right here that I have had no experience with the long angle bar. Our road is exclusively laid with a 24-inch bar, suspended joint, and I have this to say, that I have had some trouble with splices breaking from the top down, but not to the extent that some of the members here relate. I do not think I have taken off within the last four years over about 300 bars that were broken in that way, and our tonnage is quite heavy. We have from 45 to 50-ton engines hammering over that 56-pound rail, and we have the same trouble with joints dropping, so I think, perhaps, that there is 30 per cent. of the joints that droop a very little. I think one thing that accounts for our not having [illegible] any more broken bars is that our joint ties are close together—[illegible] only about 8 inches apart.

Mr. James Sloan—What splice do you use; whose make?

Mr. McEntaffer—They are made at Youngstown. They [illegible] weigh 26 pounds, 13 to the bar, 24-inch bar, I think.

Mr. Hickey—Have you any supported joints?

Mr. McEntaffer—I have not, but we are laying all our new track with broken joints.

Mr. Hickey—And suspended?

Mr. McEntaffer—Yes, sir. But from what I have seen on other roads I prefer the supported joint.

Mr. Hawkins—Norf. Sou. R. R.—On 83 miles of my road I use an angle bar, 22 inches long, with steel rail, and a portion of the road is laid with iron rail, 22-inch straight bar. I have had no trouble with broken fish plates or angle bars so far. Not more than 5 per cent. of our fish plates broke. I find our 32-inch angle bar answers our track. About 5 per cent. of our fish plates, straight bars, broke. In the absence of gravel or rock ballast we have to depend entirely upon native soil and we have over our road now a heavy traffic. Our engines are about 40 tons in weight and I have no trouble in the breakage of fish plates. I would prefer always the suspended joint, especially on a dirt road, or with mud ballast, with an even or straight line and a broken joint on a curve.

Mr. W. L. McGarr—Beech Creek Ry.—My experience with joints I will give you briefly. In 1883 I put down 26 miles of track with 34-inch joints. Since that time we have run over it with a suspension of five inches at either end, and I have found but very little deflection and we are running 60-ton engines and 30-ton loaded cars over it continually. I have had some experience with the long plates on the West Shore and I cannot see why deflection will not take place on any joint after contraction. There is a leverage with a locomotive passing over it. It seems to me that they will all come down. We have rock ballast, about eight inches all the way through, and we have a fine line, heavy locomotives and cars, and I cannot see why a change should be made. After four years' trial it has suited us and it seems so me that it should be continued.

sident—What is the weight of your rail?

Ɔarr—Sixty-seven pounds.

sident—And the length of your angle bar?

Ɔarr—Thirty-four inches, suspended.

ıes Sloan—How far were your joint ties apart with a r?

Ɔarr—Five inches on each side. It depends on the he tie sometimes.

ıes Sloan—With a tie under the joint and a 10-inch al all the way through, would it not make as good ›uld you not tamp the tie then?

Ɔarr—I think not.

ıes Sloan—How many ties to the mile?

Ɔarr—About 2,600, and our ties will average 7x9, 8 ınd the rail is a 67-pound rail.

n Ross—F. & P. M. R. R.—I have had something to e suspended joint for the last ten years. Our track l with coarse stone. Two-thirds of our ties are hem- one-third oak; we use an 8-inch face tie, a 21-inch spiked at both ends, and ties 5 to 6 inches apart, to width. Our traffic is pretty much all one way in time. We run log trains, 10 to 17 a day. We have ›le with the creeping of track. Sometimes on a very ıen the incline is both ways with an old-fashioned h we have trouble, but with the other switches we ouble. We use this short angle bar, 21 inches long, ties under it, and they make an excellent joint. We ıe track entirely once or twice a year, and consider country that it is a very nice rail. Our rail is a 56- , and our angle bars are 40 pounds to the bar.

. Jackson—J. S. & E. R. R.—A great deal might be › subject of track joints; there are such a vast va- nts and such a vast variety of plans for joints that would take a great deal longer than five minutes, wenty, to discuss it, but if I were to select a joint of ınd there is but little preference of the two—I would nch plate with an outside bar ⅝ of an inch, as thick make it, and use a ⅞ bolt with a good nut lock. The ; the 24-inch bar. I would use a ¾ bolt and make

I should like my ties under that 24-inc
7 inches of the end of my bar at each
of the shovel between the two joints,
joint, or with a 42-inch plate with th
better on this account. I do not kn
preference for the three-tie joint, tha
get to shimming a suspended joint yo
bearing as you would with a tie imm
therefore I would prefer the long pl
track.

Mr. Cain—How would you shim;
across the tie?

Mr. Jackson—Lengthwise of the ra

Mr. Cain—If you shim the full len
bearing the same?

Mr. Jackson—No, sir. Mr. Cain g
the P. J. line and the expansion was
out of line. I made a suspended joi
the suspended joint was about 8 inc
24-inch plate it is rather close, but I
bar.

Mr. Jas. Trumbull—S. C. R. R.—
I have had no experience with the l
all suspended joints, and I have had

eaking at all, unless it is such a season as this when it gets a tle soft. Our heft of rail is 56 pounds. We have a good al of old iron rail that I have trouble with, plain fish plate, t with the steel rail I have no trouble. The fish plate joints e suspended.

Mr. Courtney—L. S. & M. S.—I should like to make myself little more plain regarding the drawing of the angle bar presented here. (Shown on the blue print.) The general scussion seems to run in the direction of every man representing his own splice which he has experimented with, which perfectly right. Now, we have gone from the 26-inch susended joint to the 48-inch supported joint. We are using the 1-pound rail, and our reason for making this splice 48 inches ong is, that we have reduced our number of ties per mile from 2,816 to 2,640. We believe in the principle of spacing. It is economy under all circumstances, and assuming that we lay a broken joint, which we are doing, in order to space our ties uniformly it demands, as you will readily see, a 48-inch splice in addition to that to hold the rails from creeping. On our road I am fully convinced that nothing short of three ties to a rail will do it. If we cannot hold the rail from creeping we cannot maintain our gauge, and then we have no line and consequently an inferior riding track. Now this splice I have tried to represent here (showing) shows an extremely good bearing under the head or along side of the rail, for the splice, and we come to within ½ an inch of the web of the rail on the wing of the angle of the splice, which we think is sufficient for all contingencies, and by bringing it to within ½ an inch gives us the additional bearing under the head of the rail, which is important. Now, we space for this joint, beginning at the centre, 3 inches, 6 inches, and 11 inches from centre to centre of holes, and that brings the last hole to within 4 inches of the outer end of the splice. We spike in that splice three times, and I would advise slotting for the outside centre tie twice instead of once. I think we need three slots in the outside of joint.

At this point, on motion, Mr. Courtney's time was extended.

The President—This certainly is the most important subject before the convention, and I think we will have no reason to go away discouraged, even if we do not reach a definite co clusion this year.

Mr. Courtney—It certainly requires our deepest thought. know it is a question that has bothered me more than anythin I have ever come across in railroading.

We like to decide upon a joint that has as few pieces as pos sible. We have had a good deal of experience with th Harvey grip bolt that dispenses with the nut lock, you kno which is an important thing. The Harvey grip bolt with recess in the nut, I consider a fine appliance. This represen a section of the bolt (showing); what I mean by the recess i the nut is this: There are two threads of that bolt well pr tected under all circumstances; that gives you two threads adjust on after you have laid your rail and tightened your bo (Shown to members.) I would further say that the tendenc in spiking, that is, on the outside—and I presume it is so wi everybody—is to get away from the angle splice and the pra tice of slotting the base of the angle splice ¾ of an inch is n deep enough, because the instant the splice moves away fro the rail you have not a full bearing of the slot and it slips and cuts the corner off, and numbers of the members prese have had that experience, but by slotting for the spike some of an inch it will help that matter.

I would favor the steel splice from the fact that we ha something stiff at the joint, and we would support this joi and keep it up under adverse circumstances, and stop th nipping that is spoken of so much. We use an oblong hole the inside splice and a round hole in the outside. I wou recommend a bolt 13/16 in diameter.

Mr. Ramsey—C., H. & D. R. R.—I have had little exper ence in this line, but our division has some 60-pound steel an 60-pound iron which is laid with old fish-bar, and the ste with 28-inch angle bar weighing 30 pounds to the bar. Th angle bar keeps the track in good shape and where it is no supported it cracks from the bottom. We have had to remov quite a number since being put in the track. The old iron rail are laid square and the foreman likes them, and the only im provement he can see would be to have a tie under the joint.

Mr. Kitell—C. & N. W. R. R.—I think some who have spoke on this subject have never tried both joints; I have both kinds and there is not a suspended joint on any of mine that is level and I do not believe any man can keep them up.

Mr. Cain—What is the weight of the angle bar?

Mr. Kitell—I do not think it makes any difference. The shorter one is 22 and the longer one is 34 inches. I have three ties under it; on the suspended joint the distance between the two ties is from 9 to 11 inches.

Mr. Cain—There is too much space there.

Mr. Jackson—I would make a remark further relating to the joint, although it may not appear strictly appropriate. Something has been said about creeping track. I have made it a study for a long time, for more than thirty years, both on the chair rail and on the fish-plate, and on the chair rail I have had to punch the centres of the rail to hold it. Now, I will say fearlessly that as long as our common atmosphere is the great storehouse of electricity and you have two parallel rails, one a positive and one a negative, one will have a tendency to go one way and the other the other way, and you cannot hold them. The outside hole in the outside plate should be made round, and the inside should be an oblong hole, or you will never get at what we want. Another thing is the laying of them of steel; steel will not expand more than about half as much as iron; the latter is the greater conductor, and then with your round hole the rail must travel in the splice, and this will do a great deal to help hold the track from creeping.

Mr. Swinney—On the track I have charge of now, when I took charge of it I had 2½ to 3 miles of suspended joint with angle splice 15 pounds to 30 pounds to the joint, the same as are used on the Chicago division where I laid the suspended joint. I found we could not keep those joints up. Many of the splices broke and I attributed the fault of that to the splice fitting in very close to the web of the rail without a perfect bearing on top and bottom. We took them off and had them punched, making them a supported, rigid joint, and increased the weight of the splice on our new material and reduced the length of the splice from 24 to 22 inches and put additional weight into the splice, making an 18-pound split splice 36 pounds slotted diagonally, and all of that new track I have laid with that joint and have had no trouble whatever in kee ing the splice up.

The President—Do you have broken or even joints?

Mr. Swinney—Even joints.

Mr. Hawkins—Norf. Sou. R. R.—What is the length of the fis plate or splice bar to do with the strength, provided we adhe to the suspended joint, is the question I would ask?

Mr. Courtney—I think if you confine the discussion to th suspended joint, it does not make much difference, but if yo limit it to the supported joint—which I understand is the o favored by the majority of the members of this convention- it makes a great difference.

Mr. Cain—I supposed it was the standard track joint w were after.

The President—Yes, sir.

Mr. Cain—The one Mr. Swinney speaks of we had to squa them up last year, and I am not afraid to take any of you ove it to-day, and it is just as good a piece of mud track as can b found in the State of Illinois. We are making 60 and 65 mile an hour over it with a vestibule train.

Mr. Adams—I understand the angle bar is lengthened to mak room for spacing ties, and if I understand Mr. Swinney the tie are coming in this country to be worth nearly as much as a piec of iron. I think a long angle bar, with a tie directly under th joint, is the thing yet. [Applause.]

Mr. Cain—Not if you use a steel angle bar. [Applause.]

Mr. Swinney—The reason we reduced the length of our angl bar to 22 inches was it was long enough for a supported join and we were too poor to buy the 36-pound angle joint, whic we would have done for our new rails if we could have afforde it. [Applause.]

Mr. Linsley—C., B. & Q R. R.—I did not intend to say an thing on this subject, but will remark regarding the materia we use. We use the 66-pound rail and 22-inch splice weighin 36 pounds, and our track is mostly of suspended joint, and w have a bearing under the joint and like it better. [Applause The only advantage I can see in the long splice, as Mr. Burne says, the rail does not need any support away from the join and still I see he prefers the long bar, and the only additional advantage in that is the anchorage to the rail.

Mr. Cain—Did you ever find any trouble in the rails creeping?

Mr. Linsley—In double track I have, with the broken joint (applause)—in the single track I have not. I prefer a broken joint on a curve, even with a double track.

Mr. Patch—The gentleman says he has no trouble with a square joint, but prefers a broken joint.

Mr. Linsley—Because I have tried both, and prefer a broken joint.

Mr. Patch—Give a reason. (No reply.)

Mr. Courtney—The remarks I made on this subject are made in reference to a double track rail joint. There is no reason why it would not make a good single track joint, but I think a single track joint could be made cheaper.

Mr. Linsley—I do not wish to be misunderstood in my statement. I say where we are laying the double track on a tangent I prefer a square joint; on a single track I prefer a broken joint, and even on a double track I prefer a broken joint around a curve.

Mr. Ramsey—Why do you prefer a broken joint?

Mr. Linsley—I did not come here to talk all night. [Laughter.] Well, I prefer it because the rail will wear longer and the blow is not so strong. [Applause.] And in running around a curve, you have a whole rail to support the joint.

The President—We will now read the communications we have here if we have nothing further.

The Secretary read the following letters from Mr. Thomas Dickson, of the Cleveland and Pittsburg, and from Mr. P. K. Roach, of the O. & M., both of which were received with applause:

STANDARD TRACK JOINT.

PENNSYLVANIA COMPANY.
WELLSVILLE, O., Sept. 8, 1888.

Angle bar 36 inches long, weighing 28 pounds, resting on three ties, one under joint. The quarter ties, 8 inches from centre tie. Slots for spikes over each tie. Angle bar to have 6 holes, as follows:

From centre of bar to centre of first hole . . . . 3 inches.
" " " " " " " second " . . . . 9 "
" " " " " " " third " . . . . 15 "

The above bar to be used with rail weighing 70 pounds per yar
r less. For a heavier rail, would suggest a bar 40 inches long an
roportionately heavier.

THOS. DICKSON.

SUBJECT: A STANDARD TRACK JOINT.

OHIO AND MISSISSIPPI RAILWAY COMPANY.
PANA, Ill., Sept. 10, 1888.

Mr. Chairman, and Gentlemen of the Roadmasters' Association
America:

You have before you at this meeting for discussion five (5) im
portant subjects, one of which I consider very important, namely
A Standard Track Joint.

When discussing this subject, you are discussing the main ste
for good or bad track. In my opinion there are no subjects bearin
so direct upon what is essential to good and economically mai
tained track as the joint. This subject ought to bring forth fro
every member present an expression of his views, freely discuss
and, when voting, do so as your conscience dictates, keeping
mind, however, the interest of the corporation you represent. A
betterments are, of course, to their interest.

Owing to my inability of meeting with you at Washington fro
reasons beyond my control, the idea suggested itself to lay befo
you my own as an individual opinion as to what construction of
joint I favor, and I take this means, gentlemen, of going before yo
both in letter and spirit, first, as an advocate of what is known
supported joint—that is, a good shaped tie square under the joi t,
regardless of all things. Second, as an advocate of the forty (4 0)
inch steel angle bar, made in such a manner as to be flush with b
of rail except at each end, which should taper slightly, the bars
be slotted in the body of base and about 2 inches from either en
to be spiked through and onto ties especially arranged for the
Here we have the three (3) tie joint, the centre or joint tie to b
spiked snugly without any slots in the base of plates, the bolt hol
to consist of two in each rail, or four in each joint, and to be of
uniform punching; *i. e.*, the same distance from the centre of o
hole to the centre of the next hole in both rails and bars, and whe
the joint is together and after calculating for the proper expansio
between rails, which is essential to perfect track, I would sugg
the allowance for expansion to be left to the difference between th
size of the bolts and size of bolt holes in the rails, the bolts an
bolt holes in plates to fit snugly and equipped with nut locks

ich manufacture as to prevent nuts from working loose. The heory is for all the fastenings to remain stationary, while the ifference in size between the bolts and bolt holes only should equal he amount for expansion or wave of the rail required.

The expansion and retraction of rails, gentlemen, as you know, is indispensable, consequently we must provide for it.

As an advocate of the supported or three-tie joint, I do not speak on a personal experience in a sense only—from observation deved from a neighboring road, namely, the Chicago and Alton. hat company has to-day the supported joint, embracing three (3) ies, with the forty (40) inch iron angle bars, the four-bolt joint, nd in the writer's opinion it surpasses any other joint so far as his knowledge goes.

Why should not the supported supersede the suspended joint?

The answer will be, for various reasons—in fact, they are too numerous to mention—two notable ones, however, namely, broken angle plates in centre equals a broken rail without any apparent alarm about its danger. Now, often has it come under our notice in sending a man patrolling the track for him to find a broken rail between two ties. He will get very much alarmed, flag all trains, block under and spike, do everything to fix the rail, send word by first train to his section men to come at once to fix the broken rail, adding that it is very dangerous because it is broken between two ties. On investigation we find his report to be correct.

Now, the same man no doubt has walked past suspended joints where both plates are broken in the centre and paid no particular attention to them. From some cause better known to himself, he seems to think they are no danger, and passes right along.

I would like to have some one explain why this joint in this condition is not as dangerous as the broken rail that caused all the noise. In short, isn't it a broken rail?

Some advocate of suspended joints will say he ought to put on plates, but it isn't every road that has the same pattern of plates on hand.

Here, however, is where the standard punched plate, as already mentioned, will come into good use by taking off the broken parts and use the half ones, which would enable the use of two bolts, one in end of each rail. This, of course, would hold a joint until such time as whole plates could be furnished, and the same might be said of the supported joint in event of plates breaking in the centre, but with the supported joint it matters not if plates are broken, there is a good tie under the end of rail which is a support with no fear of rails breaking.

Gentlemen, with the supported joint you have but one tie to look after instead of two, as is the case with the suspended joint. Moreover, our aim is to try and make the joint as strong as any other part of the rail with a view to safety, good track, and economically maintained.

Then I say, in the name of progress, why do we adhere to the evil of suspended joints? And it lays with you, gentlemen, at this meeting to say to our General Managers and to the world, discard your pet, the suspended joint, which, in the eyes of this Association, is a wrong theory and expensive practice.

Give to us instead a supported joint as fast as renewals are necessary and in return we will give to you a better, safer, and more economically maintained track.

Yours truly,
P. K. ROACH,
O. & M. Railway.

On motion of Mr. Isaac Burnett, adjourned until 9 o'clock Wednesday morning, September 12th, 1888.

Wednesday's Session.

WEDNESDAY MORNING, September 12, 1888.

rention was called to order at 9.20 A. M., President e chair.

sident—If there are any members present who have ed to their names we would be glad to have them do ish to complete the record of all members present. is to make the record complete.

little late this morning; we were 45 minutes late morning. Since the last election of new members ceived several new applications which we will now

retary read the names of those who had complied cessary rules to entitle them to become members, lowing letter from Mr. Edgar R. Mills, of the Cana- c Railway Company, which letter was, on motion, d voted to be placed upon the minutes, and the five therein mentioned were admitted to membership. s' letter read as follows:

CANADIAN PACIFIC RAILWAY COMPANY.
WINNIPEG, Sept. 7, 1888.

g, Esq., President Roadmasters' Association of America:

IEND —I inclose herewith five applications for member- Association; be good enough to attach your name. They od standing on our line. I hope to be with you before ment. Please ask Mr. Reed, Treasurer, to send me word I owe the Treasurer, and will remit, in case I do not are doing some extra work and "you know how it is I wish you would consider St. Paul for the next meet- k you would increase membership largely if you come orthwest. I know that a great many of the members ing of this part of the country. You will be well cared rates can be obtained for hotel accommodations.

earnest desire for the success of this meeting,

I am, yours truly,

EDGAR R. MILLS.

Mr. Caffrey—Mr. President: I have a resolution to offer that is, that the President of this Association appoint a committee to report a vote of thanks to the Baltimore & Ohio Railroad Company, their's being the only railroad entering the city of Washington that honored the credentials of members in bringing them to this place of meeting.

Motion put and carried unanimously.

The President—I will name for that committee Messrs. R. Caffrey, Lehigh Valley R. R.; H. W. Reed, S., F. & W. R. R.; Jas. Sloan, C. & E. I. Ry.; C. H. Cornell, C. M. & St. P.; J. H. Linsley, C., B. & Q., and Mr. S. L. Swinney, W., St. L. & P., and I desire that this committee have the report ready to present to the convention when we assemble at 3 P. M.

Mr. Kerwin—I would move that this apply to the Northwestern Road also.

The President—I would mention that the Chicago & Northwestern is really included in that. I could not select that company without slighting the others, all of which will appear in the printed proceedings of this meeting.

When we adjourned last evening the subject under discussion was "Standard Track Joints," and now we will continue that subject. We should like to hear from any gentleman who has anything further to say on that subject. I think it has been pretty thoroughly discussed.

Mr. Ellis—I think the subject has been well discussed, and I have a resolution to offer to close this discussion of track joints, so that we may proceed to the other questions.

Resolved, That both the minority and majority reports of the Committee on Standard Track Joints be recommitted to the committee to report at the next meeting, with the request to members who are so situated as to be able to experiment with the two-tie, suspended, heavy angle bar, and the three-tie supported angle bar as a joint, placing the same not only on the new steel rail being laid, but upon steel rail that has been in use and that is somewhat crippled by use. To report to the committee the practical results of such experiments.

Carried unanimously.

Mr. Caffrey—I would ask for information if any of the Committee on Standard Track Joints, now named, have refused to serve on that committee?

e President—I will say replies were received by the Secre- from members of the committee except from Mr. W. ı, of the B. & O., and from Mr. Riley.

. John Sloan—I think Mr. Dunn has gone out of railroad-

e President—The only two of the committee not respond- ere Mr. Dunn, who was not heard from, and Mr. Riley, declined to serve. When the executive committee meet cide on the questions for the next meeting and to appoint ommittees, it will then be proper for them to replace the s of these gentlemen with others if it is found that they t wish to serve for the next meeting.

e next subject for discussion is that of "Standard Hand- " I will appoint on that committee to take the place of ıembers absent, in the place of Mr. Roach, Mr. Cain, and ce of Mr. Diddle, Mr. Stearns. Mr. Melville still remains hairman of that committee. Mr. Melville, are you ready port?

. Melville—We wish further time; we will be prepared to t at the afternoon session.

. Cain—We can make a verbal report now. It is my osition to turn this matter over to the master car builders. re not mechanics. It is my idea to let them build a car it themselves.

e President—Well, that should be done in a formal man- the report of the committee being made to that effect, if onvention so decide.

. C. H. Cornell—C. M. & St. P. R. R.—We are not anics and have not the education that would admit of our g out the details of a hand-car, but we can recommend t what the heft, durability and speed of a car should be, hen you come to the minute parts of the hand-car I think a little out of our line.

e President—The third subject is a cool one, it is "Snow Snow Plows." Mr. Cox, of the C., St. P. M. & O. R. R., man of that committee, I am sorry to say, is a gentleman has had more experience than most of us present. I have ved a letter from him in which he says he is confined to oom and cannot leave. He has sent us a blue print and a letter, which the next gentleman on the committee, Mr. Burgwin, will read and exhibit for the information of the Association, Mr. Burgwin in the order on the list becoming chairman of the committee.

Mr. Burgwin—Mr. President and gentlemen of the Association, Mr. Cox, the chairman of this committee, obtained the views of the various members of this committee by correspondence as well as he could and from that has drawn up this report, combining those views, and which report reads as follows:

To the President and Members of the Roadmasters' Association of America:

Your committee on "Snow and Snow Plows" beg leave to report as follows:

For light snow, to the depth of three feet or less, and before the cuts have become very high a common iron snow plow (as used on the Omaha Railway and shown by blue prints) attached to the front end of an engine will do quick and effective work, with an engine without a plow following, to be used for a dragout and to pull a car containing a crew of men, say twenty to forty, to dig out the engine if necessary and to clean flanges behind the plow, in order to give the dragout a good rail, then when the plow has gone back for another run put the men to work with shovels cleaning out the flanges and the wet snow that has formed under the plow engine where she got stuck in the drift. It is very essential to take out that wet snow, as it will form solid ice and become very dangerous.

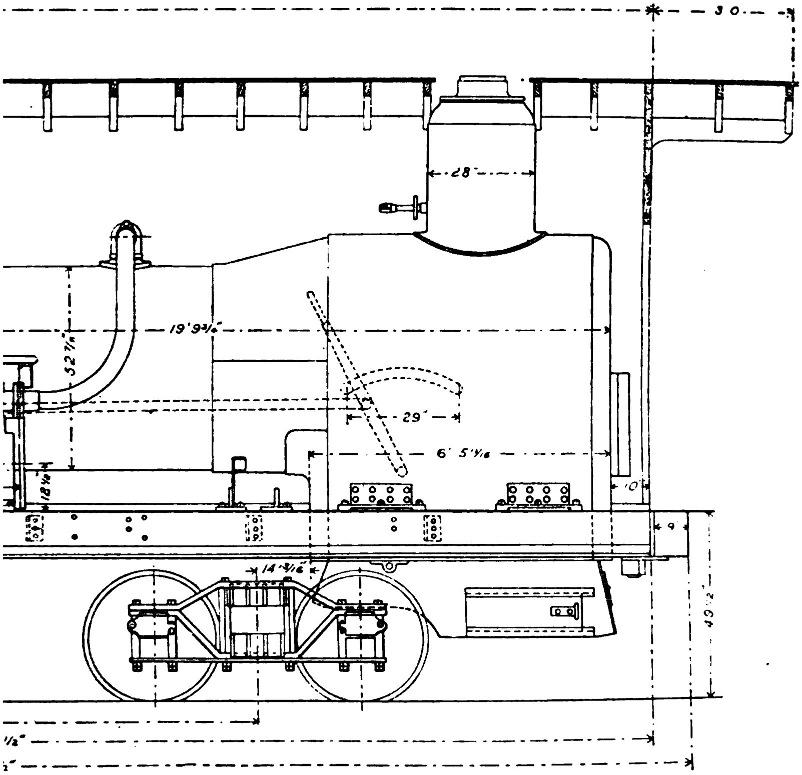
In stormy weather it is very advisable to have another plow engine headed in opposite direction from the working plow follow the first outfit closely, so that in case of another blizzard they may be able to reach some station back of them if their progress should be blocked. With an outfit as above described from thirty to sixty miles of track can be cleared under favorable circumstances.

After the track has been cleared a flanger attached to a box-car, of which a blue print is accompanying this report, which is worked by the engineer with air, should go over the road at a speed of about fifteen miles per hour and it will leave clean rails and flanges.

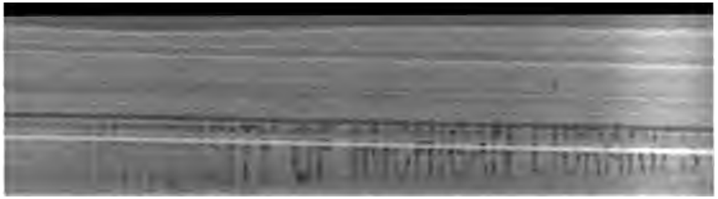
For heavy and deep or wet snow and high cuts the best known device for removing snow is the "Rotary Steam Snow Shovel," of which a lithograph and blue print is attached.

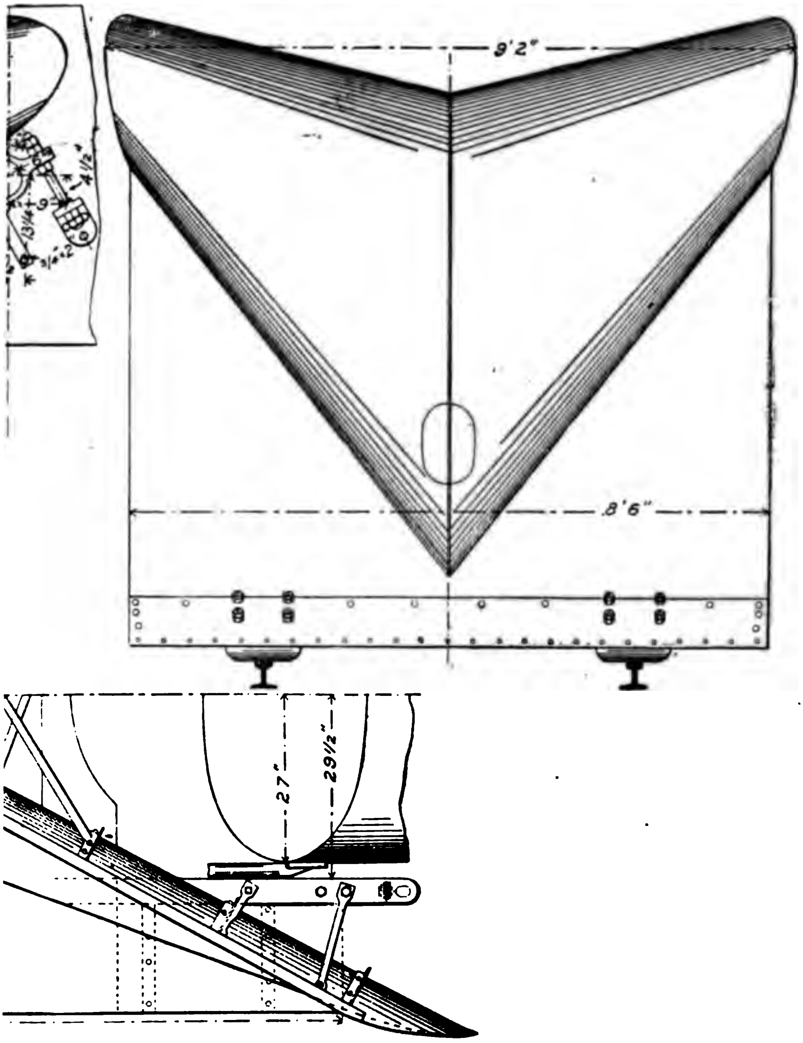
This steam shovel will not only clear the track, but in place of forming high cuts, which all old appliances do in course of time, it throws the snow from 100 to 200 feet from the track, so that the cuts will not gain much in heights.

For all cuts of large dimensions the best protection against snow



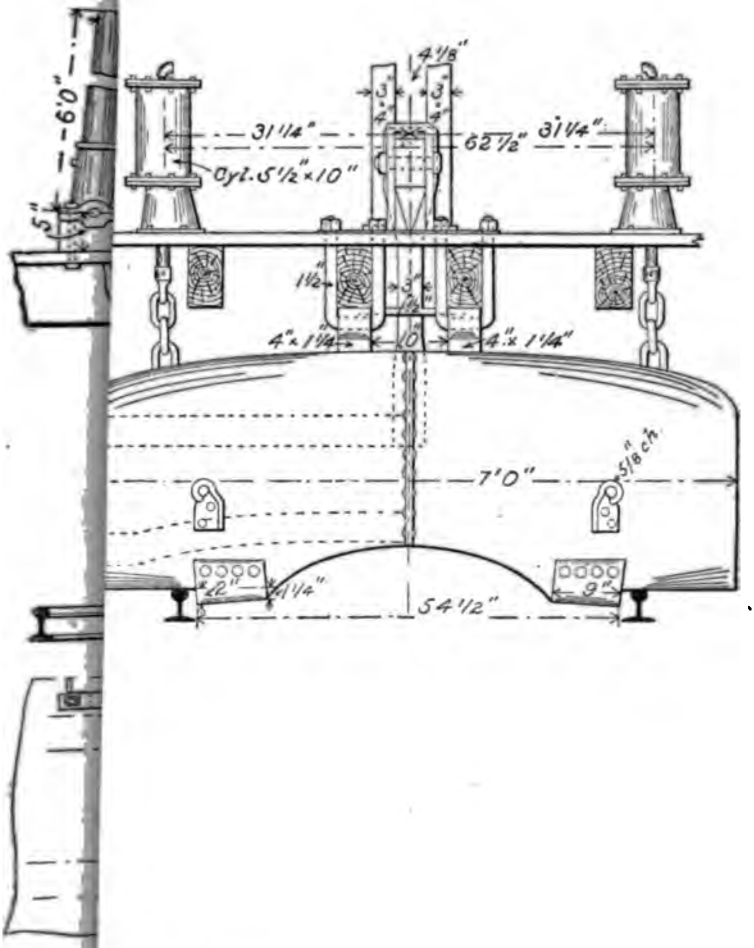
T OF COMMITTEE ON SNOW AND SNOW PLOWS.



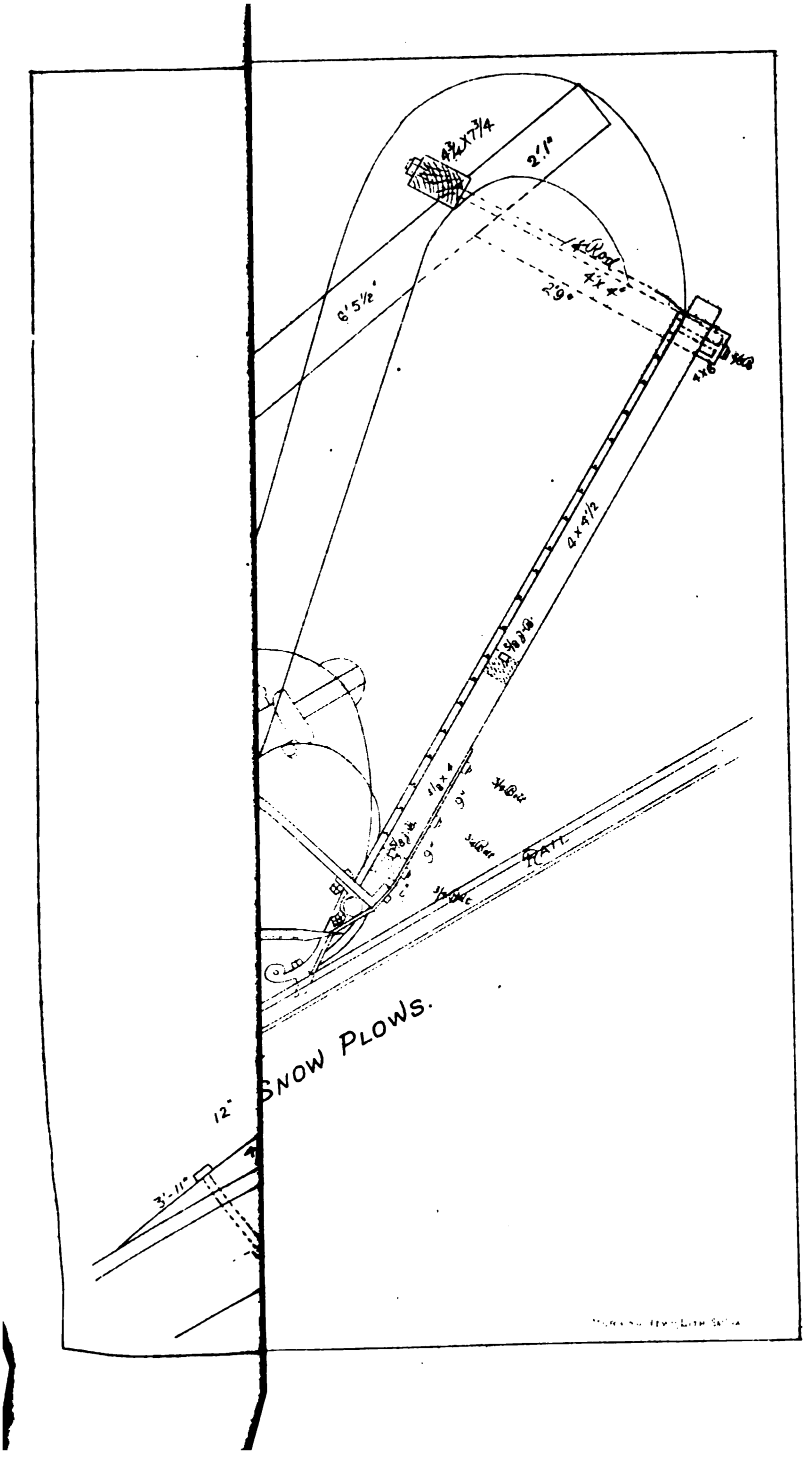


OMMITTEE ON SNOW AND SNOW PLOWS.

UNIVERSITY OF MICHIGAN LIBRARIES



AND SNOW PLOWS.


4¾X7¾
2'1"
6'5½"
1¼ Rod
4'x4"
2'9"
4x6
4x4½
⅛x4
9"
9"
¾ Bolt
¾ Bolt
Rail
12"
SNOW PLOWS.
3'-11"

three lines of stationary snow fences, 8 feet high, set parallel at istances of 75, 100 and 125 feet from the track.

In ordinary winters this will be found the best protection against ow, but we do not know whether this is called for in the report, ut simply mention the fact as the main object is to keep the snow f the track if possible and then you don't have to fight it.

In places where it is impossible to obtain the right-of-way neces-ry for stationary fences sometimes permission can be gained to set a portable fence every winter and remove it in the spring, such fence constructed of thirteen 6-inch 16-foot boards, with three oss pieces 2x4x8, with boards one inch apart, will give good ser-ce.

The method on the Omaha is to fence all the cuts they can, thus eping them clear of snow, and those that can not be kept clear by nces and in long continued winters with severe and frequent rms there is no alternative but to use plows and flangers to keep e road open.

A. Cox, *C., St. P. M. & O.*
Chairman.

The President—We have the blue print here accompanying e report, and I should be pleased to have you look at this int before I place the report of the committee before the con-ntion for their disposal. (Blue print examined by members.)

You have heard the report of the Committee on Snow lows, and have also examined the blue print. What is the leasure of the Association?

Mr. Cain—I move that the committee be discharged and the eport accepted and placed before the convention for their con-ideration.

Seconded and carried.

The President—The report is before the house for discussion, entlemen. (Nothing said.)

After deliberation, no one responding:

The President—The next subject for consideration is No. 4 n the list: "Specifications for Cross Ties." The chairman of at committee is Mr. S. L. Swinney, who will now read the eport.

Mr. S. L. Swinney—The report reads as follows:

o the Officers and Members of the Roadmasters' Association of America:

GENTLEMEN—Your Committee on Specifications for Cross Ties nd Manner of Laying in Track for Different Weights of Rail, &c., ould respectfully recommend:

Fourth. Your committee would recommend that nc
ties to each 30 feet of track (or 2,992 per mile), even
inches from centre to centre, should be used in all tr
all weights of rail, and in all cases when ties are s
from heavy timber having a heart and sap side to the
be laid with the heart side to the rail.

Fifth. So far as the experience of your committee e
make no recommendation upon metallic ties or ties he
timber than those named and prepared by chemical
all experiments known to your committee have
expense of trial.

S. L. Swinn
J. H. Lins

Mr. Swinney—I have letters here from two of t
expressing their views, which I will read. The
Mr. H. A. Buel, of the C., M. & St. P., which read

Chicago, Milwaukee & St. Paul
River Divis
Red Wing, Minn., Aug.

S. L. Swinney, Esq., R. M., T. P. & W. R'y, Cuba,

Dear Sir—Yours of August 12th received. In rep
This tie question is a question hard to determine w
all roads; of course we can tell what is best needed o
find that the white or burr oak tie gives the best satis
and lasts fully as long in the Northwest as any, th
tie. We are not using many split ties; could not say
would lay them, heart or sap up, but am of the opinio

3,000 ties per mile for two reasons; one is, it will require less help to keep it up after once in shape, and the other is you will have less broken rails on lighter steel. My idea of a tie is this: 8 feet long, 7 inches thick and not less than 9-inch face, made from green, sound timber neatly hewn and taken out of wind, ends squared and would lay them by line on one side 15½ inches from outside of base to rail evenly spaced; would not put in main track a tie less than 9-inch face or more than 12, and would sort them to make a first-class track. The average life of white or burr oak ties is about six years; the pine, hemlock and tamarack ties' average life is about four years; the cedar about seven years, or longer if tie plates are used. The metal tie I have had no experience with. The white or burr oak tie is the best, both for service and durability, to be found in the Northwest to be laid in all soils used for ballast that some roads have to use. We are having plenty of work for this season of year. I am working one steam shovel and one train with hand shovels or No. 2's. Cornell is still on deck with cook in the hold. Rafferty and Cox are in harness every day; hear from them often. Hope to meet you in Washington, and hear from you often.

I remain,

Respectfully yours,

H. A. BUEL.

Mr. Swinney—The following is from Mr. M. J. McInarna :

NEW YORK, LAKE ERIE & WESTERN R. R. CO.
MANSFIELD, Ohio, Sept. 5, 1888.

S. L. Swinney, Esq., R. M., T. P. & W. R. R., Cuba, Ill.:

DEAR SIR—Your favor of August 12th received, but I was away from home at the time on a vacation and so delayed writing you upon the subject mentioned in your letter. The best varieties of timber for cross ties are white oak, swamp oak, burr oak, chestnut oak, yellow cedar and tamarack. I would not recommend using any kind but white oak, swamp oak and burr oak in *curves*; the other kinds should only be used in tangents and not at all if oak timber can be obtained at a fair price. The number of ties per mile should not be less than 3,000 under the heaviest rail now in use, which is from 68½ to 80 pounds per yard. It is wrong to reduce the number of ties in the track by increasing the weight of the rail until we have a track that will compete with the rolling stock, which is constantly being increased in *weight*.

I have never used any metal ties; have used some ties that were preserved by chemical process prepared by the American Wood Preserving Co., at Defiance, Ohio. They were made from black ash timber mostly, and their average life was about six years.

The best dimensions for cross ties are 7x8x8½, and in putting them in the track they should be laid with the heart side upper-most, because it is harder, will hold the spike better, and offers more resistance to the wearing in of the rail than the sap side does.

Hoping that these few hasty opinions may be of some service to you in making your report, I am,

Yours very truly,

M. J. McInarna.

P. S.—I have a felon on one of my fingers which is very sore and am afraid that I will not be able to go to Washington. M. J. M.

Mr. H. W. Reed—I would move that the report be taken up by sections, each section being considered and passed upon separately.

Seconded and carried.

"1st specification. All ties for stone, gravel, furnace slag and cinder ballast should be 7 inches thick, 9 inches face and 9 feet long, hewn in parallel faces out of wind, with square ends, and as far as possible all sap removed."

The President—The first section of the report is open for discussion.

Mr. Cain—I do not know that I could add anything more than it should be of burr or white oak.

Mr. Burgdorf—Union Pacific—I think it is about right except the length. I do not see the necessity of a tie 9 feet long. I think 8 feet long enough.

Mr. Courtney—L. S. & M. S.—I think for good ballast, stone, slag, and gravel, an 8½-foot tie is sufficient in length.

Mr. Adams—A 9-inch face in this country for a tie is difficult to secure. I think 8 feet is long enough, and as to the thickness, they should either be all 7 or all 6-inch ties.

Mr. Cornell—I think a standard tie, 6x8, 8 feet long, is abou the tie we would all get through this country. White oak even, is getting scarce now, and a white oak tie, 9-inch face, is just about impossible to get. White oak does not grow s fast as railroad companies do.

The President—May be the railroad companies are growi too fast.

Mr. Cornell—They are growing faster than the timber, asi from the soft woods, and they do not fill the bill with the heav traffic.

Mr. Houghton—L. S. & M. S. Ry.—I should like to be familiar with the different thicknesses of t used by the different companies. A tie seven inches thick is better than a tie six inches thick. It seems to me that with a tie seven inches thick, made of whole timber, you cannot get the same amount of face as with a six-inch tie, and it is a question in my mind whether the extra face would be better than the extra thickness.

Mr. Linsley—Illinois Central—When we use a 50-pound rail e had a tie which was eight feet long and eight inches face, nd we used about 2,640 to the mile, one to every two feet. he traffic of the different roads, our road as well as others, s increased in weight of engines, cars and everything that sses over the track, even the rail has increased about one-ird, and I contend that the weight of the tie should increase n proportion to the weight of the rail. In the first place I would ave preferred a still heavier tie for a standard tie, although I m satisfied that this convention will not adopt anything heavier than the one we proposed. But in regard to the length of the tie the bearing should be the same on the outside that it is on the inside, although nine feet does not quite reach it, and the thickness of the tie should be sufficient to resist the weight passing over it without springing much, or you will have a low place under your rail and the centre will hold up, but by having equal bearings on the outside and the inside with timber enough to resist the pressure that difficulty will be obviated. I presume every member here in raising track and putting it up all examine the outside under the stringers. Why do they do that? Because they do not have as much bearing there as in the centre. I do not think a tie should be less than nine feet to have anywhere near an equal bearing.

Mr. W. H. Stearns—C. L. & N. W. R. R.—I think it is too expensive a tie. The timber is growing more scarce every year. There is no probability of our getting such a tie. I should prefer to have a tie adapted to the width of our road-bed, with a shoulder even at all times with the centre of the end of the tie. Again with the amount of ballast we have on the ordinary railroad I think the depth of the tie should not exceed six inches at the most. A gentleman remarked that we tamped the end of the tie more than we did the centre. I think the centre should be tamped equally with the ends. I would not recommend a tie over eight feet long or over seven-inch face. We get ties of various widths. I think we should endeavor to get ties of as even a width as possible, and not have one with a nine-inch face and one with a six-inch face next to it.

Mr. Linsley—Where do the majority of your ties break?

Mr. Stearns—Right under the rail.

Mr. Jackson—Mr. President, I have had considerable experience with cross-ties and have had them under various conditions, say, for instance, the railroad from Mayville to New Orleans. They undertook to lay that with an eight-foot tie. The material used was soft and spongy, and they changed and got a tie nine feet long and eight inches thick, and nothing less than an 8-inch face, which gave them good results. There was another case I have in mind, that of the Memphis and Charleston Road, which was also on spongy material, all clay. no ballast. We got our ties 8 inches thick, 8½ feet long, and 8-inch face, which gave good results. The reason for the increased length of the tie was the waving motion of the rail being too great, which caused too much creeping of the rail. Now on stone ballast, as we have on the B. & O., stone and gravel. an 8½-foot tie, 7 inches thick, 8-inch face, is sufficient, if we can have that tie as even as possible, no tie being less according to specification than 7 inches, and only 10 in 100 of that dimensions, and the balance 8 and 9, which would give an even bearing, and then with proper spiking and a good rail joint we can have a very nice track and overcome largely the waving motion in the track.

J. R. Patch—Conn. River R. R.—Mr. President, our specification for cross-ties read: All ties purchased for this road shall answer the following specification: "No tie will be received except those cut from first-class second growth chestnut timber. to be not less than 7 inches thick, and not less than 6-inch face and 8 feet in length. Both ends sawed off square." That is the tie we try to buy. We place our ties 2,640 to the mile. A gentleman here spoke of having ties only 10 per cent. of them less than a 6-inch face, and not over 10 per cent. that will exceed an 8-inch face. I think in our part of the country it would be very hard to buy such kind of ties. Parties who furnish ties for us usually cut them from timber of sudden growth, rather

and difficult to secure, and they could not afford to cut
ith as little variation in the face as you name here. Some
ust be selected that are of less face and many that are a
deal more than a 6-inch face. Our timber is very valuable
e timber is getting scarce, so that we are obliged to accept
various dimensions in the face. We calculate to have
ickness of the same 7 inches, none over and none less.
fe of our chestnut ties is from 7 to 8 years. We do not
ny ties rot out; they wear out; they cut through under
l and the reason I should prefer a 7-inch thick tie instead
6 inches thick is because we get one more inch in the
f the tie. We pay 45 cents for ties, delivered.

President—Do you think it would make any difference
n oak tie?

Patch—An oak tie we take as a cull, one-half price, pay-
cents apiece for them. White oak with us does not wear
it wears about like this: I have a three-throw switch in
rd at Springfield where there are trains switching over
inually almost night and day, and the ties used under
witch have been chestnut ties that have lasted about 3½
Well, I thought I would try a nice white oak tie, of
I secured the best I could buy and had them sawed 7
thick and 8 inches face, and placed them 10 inches apart
the switch. Well, they were under there three years
oked just as nice and sound as the day they were put in,
e night, through the carelessness of the switchman, the
itch engine went off that switch and the wheels cut
h the crust in that white oak tie. The crust was only
an inch and a quarter thick and which was as sound as
it was put in, and the rest of the tie was entirely rotten;
dry rot, and that is the way the oak ties have served
We do not have any tie plates at all.

Stearns—The oak tie in Massachusetts or in Indiana or
s or other parts of the West are very different things. I
een the very thing you speak of so that after you get be-
e crust there is nothing left of the Massachusetts oak tie.
diana they are entirely different, and in the West. I
you will find in the West that the oak tie is better than
estnut.

Mr. Patch—On our road I do not put any green ties into ground. I always keep a good supply of ties on hand. ties I purchased this last winter are to put into ground the n summer. I think a dry tie will last more than enough lon to pay for the interest on the money.

Mr. John Sloan—I should like to ask the gentleman whet he used sand or gravel for ballast?

Mr. Patch—It was in two feet of as good gravel as you find anywhere in New England. I do not think it would m any difference in the life of the tie whether you have 6-i face or 7-inch depth, that is, with the oak tie, because that inch crust will give away whether with 6-inch or 7-inch f I do not think it would make any material difference with chestnut tie. I do not think that would offset the life of tie, only after a tie has got cut down so that a spike will through the tie it is then not of much account.

Mr. Adams—How many ties do you have to the rail?

Mr. Patch—We have 15 or 16 ties to the rail and a 56-po rail. I think that is a sufficient number.

Mr. Adams—How long are your spikes to go through inch tie?

Mr. Patch—$5\frac{9}{16}$ inches.

Mr. Linsley—Which side of the tie do you lay up, th row or the wide side?

Mr. Patch—We lay the wide side up.

Mr. Cornell—I have gone on record as recommendir of 9-inch face. I wish to change my recommendation of 8-inch face, and 8½ feet in length, that is, in my rem

Mr. James Sloan—I am in favor of a 6x8 tie and length. I use 3,168 to the mile, 10 inches apart, and they are plenty long enough and that they mak track.

Mr. Cain—I would say either 6x8, 8½ or 9 feet, or 9 feet, white oak and buff oak, seasoned at least one the tie is used. I think the tie will last two years lc doing.

Mr. Ramsey—C., H. & D. R. R.—What size tie?

Mr. Cain—With 6x8, 8 feet long, we do not enough.

Mr. Ross—Did you use the 9-foot tie before you commenced to adopt the 8-foot tie?

Mr. Cain—We have used no 9-foot ties as yet, although I recommended an 8½ or 9-foot tie.

Mr. Hyland—I think it is all right for these folks to recommend white and burr oak ties that can get them. You could not buy enough for our road for $2.00 apiece; they are not in the country. We have to use chestnut ties when we can get those, otherwise we have to use Canada cedar. We use a chestnut tie for the first-class quality of tie as spoken of by Mr. Patch, and have to buy the small ones in with them and are troubled to get enough of those. The oak ties do not grow where we live.

Mr. Cornell—I would move that we declare that the oak tie, 6x8, 8 feet long, a hewn tie, be the standard tie in the localities where they can be got at not to exceed 50 cents a tie. I offer that as an amendment as to size.

Mr. H. W. Reed—That is the third section of this report. The first section is now under consideration, which has no reference to the material of the tie.

Mr. Cornell—But we had been discussing the different kinds of material. It would seem then that we have all been out of order.

The President—I allowed that to go on for the reason that it seemed necessary to consider the material in connection with the outlines and surface of the tie.

Mr. Linsley—We recommend this tie for a first-class tie, but do not recommend its general adoption.

Mr. Stearns—I would offer a further amendment to Mr. Cornell's amendment, that we make it a thickness of 7 inches.

Mr. Cornell—The white oak we have commences to decay on the outside, and the extra inch is that much more extra material. Ours is 6 inches and the amendment makes it 7, therefore I do not accept the amendment.

Mr. Stearns—I would ask the question on my amendment. I ask that it be made 7 inches.

Mr. Cornell's motion lost, and Mr. Cornell called for a division on his motion to make it 6 inches instead of 7, and the same was lost by a rising vote, not counted.

The President—The first section stands now as submitted by the committee.

Mr. Jackson—Since there is a diversity of opinion as to the dimensions of the tie, I would respectfully offer this: "That we recommend to our general management to give us a tie 7 inches thick, 8 inches face, and 8½ feet long."

Seconded.

Mr. H. W. Reed—Secretary—The difference is, the amendment wants an 8-foot 6-inch tie and the report a 9-foot tie. The amendment wants an 8-inch face and the report a 9-inch face.

The President—It will be necessary to vote on that twice. We will first take up the length.

Mr. James Sloan—I move an amendment to make it 8 feet.

Seconded by several, Mr. Jackson among others.

The President—That brings the length now from 8½ to 8.

Motion put and lost, as declared by the President, and a standing vote was called for, and carried, 28 to 18.

The President—The action taken on that, gentlemen, changes the first section of the report from 9 feet to read "8 feet."

We will now take up the question on the amendment offered by Mr. Jackson to make it 8 inches instead of 9 inches.

It was ruled that "the ayes had it," and a division was called for. Those in favor of an 8-inch face—reduced from 9 inches to 8 inches—arose, and there were 31 ayes and 18 nays.

The President—The amendment has passed.

The Secretary read the first section of the report as amended. for the benefit of all concerned, as follows:

> "Specification. All ties for stone, gravel, furnace, slag, and cinder ballast should be 7 inches thick, *eight* inches face, and *eight* feet long, hewn in parallel faces out of wind, with square ends, and as far as possible all sap removed."

The President—That is the first section as amended, which will now be presented for your vote.

Cries of "Question!" "Question!"

Put to vote and carried unanimously.

The President—We will now take up the second section of the report, which reads as follows:

d. For all variety of soil ballast, we would recommend a tie 6 es thick and 9 inches wide and 9 feet long."

r. H. W. Reed—S., F. & W. R. R.—I would move to amend ubstituting "7 inches thick" for "6 inches thick." My on is that I have had experience with both on soil ballast I know from that experience that a 6-inch tie is too thin. need the additional inch of material. I also move to nd the width, and change it from "9 inches" to "10 inches." length, 9 feet, is entirely satisfactory.

r. Swinney—If there is no objection, the members of the mittee who signed the report will accept that amendment make the original report of the committee to read "10 es wide."

e President—I will state for the information of the con- ion that in disposing of these subjects they are decided on e executive committee. They select a certain number of bers of this Association to report at the annual meeting on different subjects submitted. Now, there are seven mem- of that committee that will report on that subject. When bring it to the convention and submit it as a report and member offers an amendment to it, and it is accepted, it is er to act upon it as well as upon the committee's accepting r, bear you in mind, there are only seven members who pt it while there will be perhaps 50 that do not accept it; may be 40 men who do not agree with the committee. acceptance of the committee of the amendment does not erly dispose of it.

r. Swinney—I expect the committee would accept of the ndment, provided there is no objection. Even if accepted, annot get the ties of this thickness in this country. We ot get within a 9-inch face. I think 6 inches thick, 8-inch 8 feet long, with fair ballast will answer the purpose.

s. Sloan—I will say it is almost impossible to get a 9-foot ither. I do not see where the railroads of this country d get enough 9-foot ties to fill the bill if the motion was pted.

r. Reed—I think it is a question of which is the *best*. We now undertaking to adopt a standard, and if some of you unable to secure a tie of the dimensions you think the best on your lines you should not reduce the standard of others to meet your necessities. Now, from my experience in the South, I should say that the roads can get 9-foot ties, and ties 10 or 12-inch face, consequently upon a good many thousand miles of railroad this is practicable, and we will also say that it is *best*. I think all who are here from the South will agree with me that a 10-inch tie can be obtained and is the best we can use in that country. Now let us adopt that tie, and if it is impossible for you gentlemen who have not the timber to obtain them, why take the next best dimension. This Association should recommend what we consider the very best dimensions, regardless of the fact that some roads may be unable to obtain them, as we are now discussing the proper tie for mud or sand ballast. I think the remarks of the gentlemen who say they are curtailed in the size of their ties by the scarcity of timber in the country through which their road pass do not apply, as I believe they are all provided with rock ballast and we have already decided on the proper tie for rock ballast.

Mr. Cornell—I would suggest to Mr. Reed that as this is the Roadmasters' Association of America we must take into consideration the whole country in all our deliberations, and "when we are in Rome we must do as the Romans do." The prevailing tie throughout the United States is about 8 feet long, 8 inches face, and some 7 and some 6 inches thick.

Mr. Reed—Mr. Cornell, I think there are about 12,000 miles of railroad that prefer a 9-foot tie. I will state for the information of this convention that when I went on the S., F. & W. R. R. our standard dimensions were 6 inches thick, 12 inches face, and nine feet long. I wrote to every Southern road and asked the opinion of the Roadmaster. In those replies there were about 12,000 miles of railroad represented, and I will say that $\frac{9}{10}$ of the replies favored a tie 10 inches face, 7 inches thick, and 9 feet long. Now, as we are a national Association, we are establishing rules for the whole country; let us look to the wants of the South as well, and do not recommend for us a tie inadequate for our use.

Mr. Cain—I had a chance to ride over the Southern roads last May. From Montgomery to New Orleans I rode with the Roadmasters, and they had sand ballast, with ties 9 feet long.

9 and 7x10, all the way through, and even the white oak ties are 9 feet long, 7x12 many of them, with rock ballast, and ear down to the end where they had nothing but sand, from Mobile to New Orleans, they were all 7x10, 9 feet long, and as pretty a riding track as I had ever seen anywhere in the North, and nothing but the natural soil, and the Roadmasters claimed to me that they found better results with that length of tie and specifications than any other they could secure. It was all yellow pine, to be sure, and it makes a splendid tie, and talking with a division superintendent, he said they lasted from six to eight years. Why, that will outlast our oak ties; and hen he said the tie did not rot, only where the rail cut hrough.

Mr. Patch—That is all very well for localities where the tim- er can be got, but I do not think our general managers who nt us here to this meeting would think we were a smart set men if we were to advocate a tie here that we knew it was possible for us to get to use!

Mr. Reed—As I have already stated, we have selected the for Mr. Patch, who has good gravel ballast, and I did not ject to that selection, but we are now selecting a tie for sand llast, and Mr. Patch should recollect this difference.

The President—Probably a few words from me may explain is matter, so that we may dispose of it without a long discus- on. It goes without saying that the majority who will vote this second section of the report will do so because they now they can carry it out, and the minority will vote against because they know they cannot carry it out. Hence, we n understand that it is impracticable for this Association to commend a standard cross-tie for the entire United States, ecause this timber does not grow in every locality, therefore ach representative must make his choice to conform to the imber that grows in his locality.

Mr. O. F. Jordan—M. C. R. R.—It would seem to me that the number of ties, and the thickness of the ties, depends upon the amount of tonnage passing over any particular road, as well as the weight of rail, etc. For a heavy tonnage, and a 70-pound rail or less, I would recommend that the ties be 7 inches thick, 9-inch face, 9 feet long, and not less than 3,000 to the mile. For a moderate, or light tonnage, I would recommend that the ties be 6x8, 8 feet long, and 2,640 to the mile.

The President—Gentlemen, do not let us lose sight of the fact that we are discussing Mr. Reed's amendment, the second section.

Mr. Stearns—The conditions are different in the South, and I do not think any blame would attach if we were to adopt a tie that would suit the South. I move that we accept Mr. Reed's motion.

Seconded.

Mr. Linsley—I do not think it practicable for every road to adopt the tie we recommend, because it would not be practicable for them to do so in many parts of the country, but I do think it is well for us to express our opinion as to what we think the best tie is.

Mr. James Sloan—If there are 12,000 miles of road in the South that wish a 9-foot tie, I would vote for that, but not for the roads up North.

Mr. Campbell—O. C. R. R.—I believe an 8½-foot tie, 7 inches thick, and about 9 to 11-inch face, is about the best tie—that is, for our country. If I were in a cedar or chestnut country I should be ready to adapt myself to that kind of timber, but my impression is that a white or burr oak tie, 8½ feet long, 7 inches thick, and from 9 to 11 inches wide, is the best we can get.

Mr. Burgdorf—We recommended a tie 8 feet long for gravel and rock ballast, and now the question comes up, whether for another part of the road, where they have only soil ballast, we should recommend a tie 9 feet long.

The President—It is not on the same road, but in different sections of the country, where there is no rock or improved ballast, the ties should be of various lengths on account of the differences in the soil.

Mr. Linsley—The same tie that is good in South Carolina is good in Illinois—in this matter I am strongly opposed to dividing the North and South. [Laughter.]

The President—There is no reference made by any gentleman to any "North" or "South" in the matter at all, yet it is well known that the soil varies in different localities. You may like, for instance, Pennsylvania, Iowa, Alabama, Ohio, etc., and the soil varies in the different States.

Cries of "Question!" "Question!"

The Secretary read the second section as amended, as follows:

"2d. For all variety of soil ballast, we would recommend a tie 7 inches thick, 10 inches wide, and 9 feet long."

Mr. James Sloan—I would like to make an amendment to the amendment, to make that read "8-foot long."

Seconded.

The President—Do you accept the amendment, Mr. Reed?

Mr. Reed—No, sir.

Mr. Jas. Sloan—An amendment to the amendment is always in order.

The President—Well, we will have to vote upon it now, as Mr. Reed refuses to accept it.

Motion lost.

Mr. Jas. Sloan called for a division of the house, which was lost, 18 to 29.

The President—We will return to the amendment of the second section, as amended by Mr. Reed. (Cries of "Question!" "Question!")

Motion put and carried, and the second section adopted as amended by Mr. Reed.

The President—We will now take up the third section of the report.

Mr. Jas. Sloan—There is no use of discussing that timber question, it includes "all kinds." I move we make it any kind of timber we wish to use.

Mr. Cornell—I object to basswood. [Laughter.]

On motion of Mr. H. W. Reed the word "pine" was inserted and then the third section as amended and adopted read as follows:

3d. The best varieties of timber known to your committee for cross-ties are pine, burr oak, white oak, chestnut oak, white cedar, tamarack, chestnut, black walnut, in the order named, and possibiy other kinds of timber not known to your committee.

Mr. James Sloan (after the reading of the fourth section)—I move that the number of ties to the mile be 3,168.

Seconded by Mr. Cornell and motion lost.

make no recommendation upon metallic ties, or ties
other timber than those named, and prepared by chemica
as all experiments known to your committee have not
pense of trial.

S. L. S
J. H. I
Co

And then the report was unanimously adopted as

Mr. Ellis—Mr. President, before proceeding t
question I would say if there are any members p
have soft wood in use for ties, which has been put
process for the purpose of preserving it, or have
thing to prevent the tie from becoming cut into I
to hear from them on that subject.

The President—We will bring that question up,
under the head of miscellaneous matters; it would
order now.

Gentlemen, the next question for discussion is
"Labor on track; labor required under varying c
Mr. Jordan and others are on that committee.

Mr. Jordan—M. C. R. R.—There has been nothin
on that question by the committee. There is only
members of the committee here, and, as I remarked
evening, I hoped there would be some other me
pointed upon that committee who would assist in p
report to be made this afternoon.

I have a communication from the Superintendents' Association on "Standard Frogs," adopted at their spring meeting, which we will perhaps take up and allow you more time. This is the first communication which has come direct from the general superintendents to us and should be taken up and acted upon in time for their meeting on the 19th.

Mr. Isaac Burnett—Sup't Joliet Steel Co.—Mr. President, the railway supply people have rented a room across the way and have there on exhibition their exhibits and I move that we adjourn this meeting until 3 o'clock P. M. and go directly over there in a body and inspect their material.

Seconded.

The President—I will mention for your information: First, that arrangements are made by which we will have lunch at the hotel at 12 noon, and at 1 P. M. it is necessary for the members of this Association to fill an appointment with the President of the United States. At 1.30, I believe, Mr. Bigelow has arranged for us to reach that point. I will also mention that after the reception arrangements have been made with one of the photographers of Washington to take the picture of this Association in a group. This will take place immediately after the reception. All who have ladies I hope will mention that fact to them. I should like to have not only all the Roadmasters accompany us, but the manufacturers here with us, and I must say that they have placed us under obligations to them for the kind treatment we have received at their hands and I wish them to participate with us in all the pleasures we have while in Washington.

Adjourned until 3.00 P. M.

Afternoon Session.

WEDNESDAY AFTERNOON, September 12th, 1888.

Meeting called to order at 3.00 P. M., Mr. J. W. Craig in t chair.

The President—We had proceeded as far as the subject " Hand-cars."

Mr. Cornell—If it is in order I would like to make a motio which is, that this convention extend a vote of thanks to th manufacturers and their agents of railroad appliances for th courtesy they have extended to the ladies accompanying th delegates to this convention.

Seconded, and motion put and carried.

Mr. Chas. Melville—W., St. L. & P. R. R.—Chairman of th Committee on Hand-cars, read the report of the committee, a follows:

To the Roadmasters' Association of America:

We, your committee, would respectfully refer this report to th master car builders, with the following suggestions: That the ca shall weigh 550 pounds, and not to exceed 600 pounds, with a ste axle 1½ inches in diameter, with 1⅜ inches journal, with 4-foo wheel base and 24-inch wheel, the tread to be 3½ inches, and th body of the car to be 7 feet in length.

CHARLES MELVILLE,
WM. H. STEARNS,
C. H. CORNELL,
JAMES SLOAN,
G. E. CAIN,
Committee.

On motion of Mr. Isaac Burnett the report of the committe was accepted and the committee discharged.

The President—The next subject will be " Labor on Track." Mr. O. F. Jordan is chairman of that committee, and as th chairman of that committee is not here we will pass that ove for the present.

At the spring meeting of the Superintendents' Association they submitted a standard frog, both rigid and spring rail, as a standard for the United States. The President of that association wrote me as President of the Roadmasters' Association a letter, which the Secretary will now read and explain the course that it is desired shall be taken with that report and the blue print accompanying it. As soon as the Secretary reads the letter we will then submit the report of the committee on his subject, together with the blue print, that we may all understand what we are to pass upon. The Secretary will now read the letter.

The letter was read by the Secretary as follows:

SUBJECT: STANDARD SOLID AND SPRING FROGS.

CHARLESTON AND SAVANNAH RAILWAY CO.
CHARLESTON, S. C., August 11, 1888.

Mr. J. W. Craig, President Roadmasters' Association:

DEAR SIR—The accompanying sheet represents the several standards of solid and spring frogs adopted at the spring meeting of the Superintendents' Association.

It would seem that this subject should have originated and been acted on by your Association and referred to the Superintendents' Association for approval, and then, after favorable action, been finally approved by the Time Convention or Association of General Managers.

I desire, however, to obtain the judgment of the Roadmasters' Association, in this somewhat irregular way, when, if favorably received, the whole subject may yet reach the court of final resort and thus this very important matter of standard frogs be settled in theory first and in practice subsequently.

You will do me the favor of placing the matter in the hands of the proper committee of your Association and advising me of the result.

Very truly,
C. S. GADSDEN,
President Association N. A. R. R. Superintendents.

The President—That is the letter, and we will now bring up the blue prints and report of the Superintendents' Association adopting the standard spring rail frog.

(The blue print was presented for examination by Mr. Tolan.)

We will read for your information the report of the superintendents and then the report of the committee on this subject

to whom was referred the letter and the blue print. '
the report of the superintendents on the subject of st
frogs.

Presented and read by the Secretary, as follows:

NEW YORK, April 9th,

To the President and Members of the Association of A
Railroad Superintendents:

GENTLEMEN—The undersigned, a committee appointe
meeting of this association, held at Cincinnati on April 1
(see pages 7 to 13 of proceedings of said meeting), beg leave
fully to report upon the matters referred to them.

Upon page 7 of said proceedings will be found a letter fr
President of the Roadmasters' Association which was so r
This letter embodies a "report of committee upon railroad fr
guard rails," in which said committee of the Association o
masters of America made five recommendations upon as
different points which are in said letter set forth at large.

Your committee would endorse the first of these recom
tions, being to the effect that the spring rail frog is superio
stiff rail. We think it superior for use in all main tracks,
think its average comparative life in the main track is n
stated.

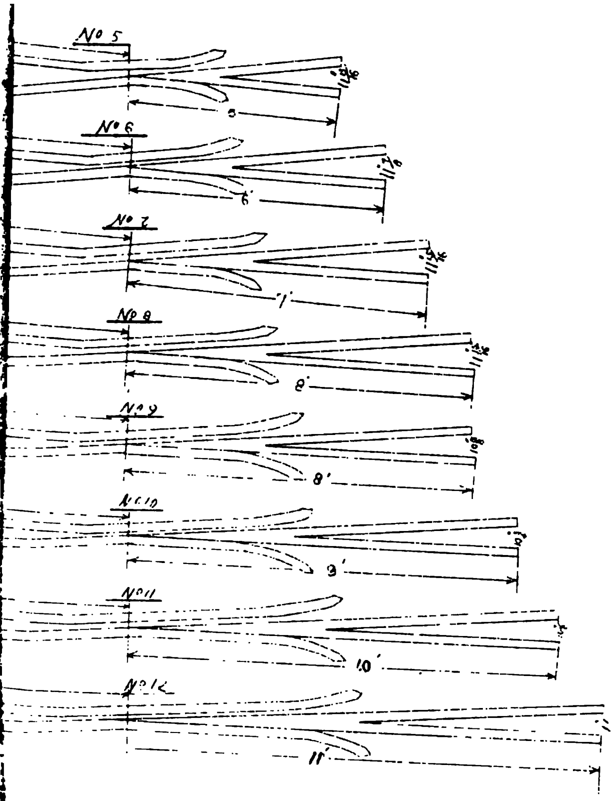
We would also approve the second recommendation of sa
mittee so far as to favor the riveted frog in preference
clamped frog.

In regard to the third recommendation we would propose
spring and stiff rail frogs such a length from the theoretica
to the heel as will give a sufficient opening at the heel for th
bars without cutting, and for this purpose we would recomn
follows:

For No. 5 a length of 5 feet.
For No. 6 a length of 6 feet.
For No. 7 a length of 7 feet.
For No. 8 a length of 8 feet.
For No. 9 a length of 8 feet.
For No. 10 a length of 9 feet.
For No. 11 a length of 10 feet.
For No. 12 a length of 10 feet.
For No. 13 a length of 11 feet.
For No. 14 a length of 12 feet.
For No. 15 a length of 13 feet.

For a stiff rail frog we would recommend from point to to
form length of 4 feet to and including No. 8; a length o
from No. 9 to 12, inclusive, and a length of 6 feet from No. 1

ANS OF
RAIL FROGS



SIONS FOR STANDARD FROGS ~
~ AS ADOPTED BY ~
ssociation of North American ~
il Road Superintendents ~
~ APRIL 1888 ~

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inclusive, these lengths being desirable for the purpose of making room for the splice plates. For spring rail frogs of all angles a length of 7 feet from point to toe.

We present a drawing herewith showing the different numbers of frogs, both spring and stiff, with their dimensions; also, a tabulated list of lengths.

In regard to recommendation No. 4 as to what should be the guard rail distance and width of channel or throat of frog, we would recommend that it should not be less than 1¾ inches and not more than 2 inches for each.

The fifth recommendation is in regard to the gauge, answering the question whether it should be exact at point or loose. We think it should be exact, not only at the point, but opposite all parts of the frog from heel to toe.

To your committee was also referred the report of committee of this association, dated Providence, R. I., October 18th, 1885. (Page 11 of same proceedings.)

Passing over the first part of this report, which would seem to need no action at our hands, we would respectfully give our opinion on the numbered recommendations contained in said report.

1st. That wing rails of fixed frogs be alike at both ends so as to be interchangeable. This recommendation your committee do not approve for the reason that after the wing rail has worn down at one end and is in condition to be reversed, the frog point will also be worn down. The reversed wing rail will be at a different elevation from the point of the frog, and for that reason the frog becomes unfit to remain in the main track.

The second recommendation is in regard to measurements of frogs. On this point your committee would recommend that they be measured on the line of track and not on the centre line of frog as proposed, for the reason that all other measurements of track are made along the rail.

We approve the third recommendation as it is merely a statement of fact.

In place of the fourth we would recommend that the length of frogs from point to heel and from point to toe be as we have above suggested, and that these lengths be always in even feet measured along the track.

Respectfully submitted,

Committee.

The President—For a proper understanding of what reference is made to the Roadmasters' Association of America by the Superintendents' Association I will have this letter read:

JOLIET, ILL., April 12, 1886.

To the President and Members of Railroad Superintendents, in Convention:

GENTLEMEN: At a meeting of the Roadmasters of America, held at the Tremont House, Chicago, October 14, 15 and 16, 1885, the question of railroad frogs was discussed at length. The committee's report was as follows:

REPORT OF COMMITTEE UPON RAILROAD FROGS AND GUARD RAILS.

Your committee upon "Railroad Frogs and Guard Rails" would respectfully report as follows:

1. Relative merits of stiff rail and spring frogs and life of same.

Your committee is of the opinion that the spring rail frog is superior to the stiff rail, and that its life is possibly three times that of the stiff rail frog.

2. Which is better—a frog riveted to a plate, or held by clamps and bolts?

Opinion is evenly divided as to which is preferable, although the life of a riveted frog is considered to be greater than a clamp frog. The loosening and rattling of the rivets make it objectionable as compared with the clamp; but in point of ultimate economy, opinion rather favors the riveted frog.

3. What is the best total length for a frog, and should its length be equal from its point?

The best total length for No. 9 to No. 11 spring rail frog seems to be fifteen feet, and for a stiff rail frog not more than ten feet. However, for the purpose of making them inter-changeable, your committee recommends the consideration of a uniform length of fifteen feet.

4. What should be the guard-rail distance? What width of channel or throat of frog?

To suit the present wheel limits, 4 feet, 5⅜ inches, as adopted by the Master Car Builders' Association, and 4 feet 5 inches, as adopted by the 4 feet, 9-inch system of roads (principally the Pennsylvania Railroad), the guard-rail distance should be two inches and the throat of the frog the same. Roads running only 4-foot, 8½-inch cars may find it advantageous to use 1¾-inch guard-rail distance and the same for throat of frog.

5. Should the gauge be exact at point or loose? How much loose, and why?

The gauge at the point should be exact; the proper gauging point being about six (6) inches back of the actual point. Your committee would advise greater carefulness in this particular on the part of maintenance-of-way men, and urge the importance of permitting no variation from the exact gauge through frogs and guard rails.

D. H. LOVELL,
Chairman.
JOHN DOYLE,
E. R. MILLS,
Committee.

1. Committee's report sustained by vote of 70 to 0.
2. Decided in favor of riveted frog, 31 to 8.
3. Spring frog to be 15 feet long, Nos. from 9 to 12. Length from point to heel and point to toe carried over to next meeting.
4. Committee's report sustained.
5. Committee's report sustained.

And upon motion by Mr. Doyle the action taken upon frogs, guard rails, etc., be referred to the Association of Railroad Superintendents for approval or return with recommendation.

Yours truly,
J. BURNETT,
President R. M. A. of A.

The President—You will see that that subject did originate with the Roadmasters' Association, and the Superintendents' Association based their report on that. You have heard the letter of the President of the Superintendents' Association, also the letter of the President of the Roadmasters' Association, that carried that subject to them in 1886, and you will now hear the report of the committee of this Association at this meeting on that subject. It will be presented by Mr. Nolan, who is chairman of that committee.

Mr. Nolan—N. O. & T. R. R.—The report reads as follows:

To the Roadmasters' Association of America:

Your committee appointed on the subject of dimensions for standard frogs, as passed upon by the Roadmasters' Association in 1886, and which was referred to the Association of North American Railroad Superintendents and acted upon by them at their meeting in April, 1888, and again returned to this Association for further consideration, beg leave to submit the following report :

That we concur in their recommendations on the following points, viz.: As to the superiority of the spring rail frog and favor its use.

In the preference of the riveted frog over the clamped frog.

In the third recommendation of sufficient width of heel to admit splices without any or the least possible cutting.

In the lengths given for the distance from heel to point, and also in the lengths from point to toe for stiff and spring rail frogs.

With the fourth recommendation, that the guard-rail distance and width of channel or throat of frog be not less than 1¾ nor more than 2 inches.

With the fifth recommendation, that the gauge should be exact at all points of the frog, except where the point is bevelled.

P. NOLAN,
Chairman.
D. H. LOVELL,
O. F. JORDAN,
R. CAFFREY.

On motion of Mr. John Sloan the report of the committe was accepted and the committee discharged.

The President—Bear in mind that this blue print is not sen here as an adopted standard that we are to be governed b and if not right we must say so. We wish the judgment of th Roadmasters' Association. They do not say whether it i right, but wish us to say whether it is right, and, if not righ t, wherein it is not right. I do not wish any member to hesita e to give his views.

The blue prints were thoroughly examined by members.

Gentlemen, you have the report before you, and have heard the different papers bearing on the subject read, and have e amined the blue prints of the reports sent to this Associatio n by the Superintendents' Association, now what disposition will you make of the report?

Mr. Ellis—Prov. & Worc. R. R.—Perhaps I am peculiarly situated, but the lengths of some of those frogs I, for one, should object to, that is with reference to the short frogs. I have had some experience with the No. 6 frog, 10 feet, 4 inches long. We here change from a wrought iron frog, 6x4, to a steel rail frog you will notice. I made my frogs all one length to save cu ting down the rail, and with a frog, No. 6, 10 feet, 4 inche long, on my curves it is too long to make a proper track to ru on.

Mr. Cornell—A. T. & S. F. R. R.—I move we lay this subject over until the next meeting. At our conventions in bot Chicago and Cleveland we have discussed this question. and i we continue it now, we will not get through with it this week I have no objection to the executive committee bringing th question up as one of the first questions for discussion. Furthe more, Mr. President, I would add to that motion that each member of the Association be furnished with a blue print and a copy of the letters bearing on this subject so that they may make it a study and come to our next meeting prepared. (Seconded.)

Cries of "Question!" "Question!" Motion put and carried unanimously.

Mr. Caffrey—Mr. President, I have a resolution to offer, as follows:

WASHINGTON, D. C., Sept. 12th, 1888.

Resolved, That a special vote of thanks of the Roadmasters' Association of America be tendered to the management of the Baltimore and Ohio Railroad, that line being the only one running into Washington honoring delegate's credentials of the Association, and that the President and Secretary are directed to send a copy of this resolution to Mr. Orland Smith, Vice-President, and Wm. W. Clements and W. W. Peabody, General Managers.

R. CAFFREY,
Chairman.
JAMES SLOAN,
S. L. SWINNEY,
J. H. LINSLEY.

On motion of Mr. Isaac Burnett the resolution was adopted.

Mr. Ellis—Prov. & Worcester R. R.—I think there is one gentleman here who has had experience in the use of ties that have been preserved and in the use of plates under the joint and on the tie. I, for one, should like to hear from Mr. Robert Black.

Seconded.

The President—We would like to hear from Mr. Black, yet I would say that it is a little out of order; but while we are waiting for Mr. Jordan as chairman to report, we may, no doubt, hear from Mr. Black with profit to all of those present.

Motion put and carried that Mr. Black be heard from.

Mr. Robert Black—Of the Manhattan Elevated R. R., New York—In relation to the cured ties, as we call them, I can submit the following: In 1884 we received 5,000 of them vulcanized. They were put in the track during 1884 and 1885. In 1885 we put in a number of creosoted ties. I am now speaking of yellow pine ties. At the same time we put in 2,000 ties which were not cured. This spring in making an examination of those ties we found the cured ties stood all the elements of the weather. But very few decayed. The creosoted ties were found as good as the day they were put in. Many of the uncured ones put in at the same time were found decayed. The general result went to show a better condition of the cured over the uncured ties for a like period of service. Our guard timber, which is 6x8, yellow pine, also showed a like result of the cured over the uncured; in fact we had to renew the uncured ties and guard timber while the cured timber is still in the road bed.

Regarding the tie-plate, Mr. President, I will state we have used 16,000 during the past two years. They are what we call a tie-plate, merely a flat plate of steel, ¼x6x8-inch steel. We have a grade of 105 feet to the mile where considerable sand is used. In one year the wear of the T rail into the tie was all the way from one-half to an inch. We were obliged to renew the ties frequently. We put tie-plates on new ties and we have no trouble now as the plate has entirely overcome the wear of the rail into the tie. Certainly these plates should be laid on a level tie. If not, they would be apt to curl up on each side of the rail. Our company likes these so well they have ordered 20,000 more plates.

Mr. Offutt of the Long Island road, I think, has had some experience in the curing of ties with fernoline, and we have had some 2,000 ties prepared with fernoline or creosote from fernoline which we used, and the general result is—and I have given it close attention—that, it preserves the life of the tie.

We have had some 10,000 feet of 2x6 yellow pine slatting prepared with vulcanite. At the same time we laid about the like quantity of uncured stuff. A recent examination showed the vulcanized stuff to be in good condition, while the uncured lumber was completely decayed. The curing process preserves the life of the timber.

Mr. Campbell—O. C. R. R.—Are these plates for all kinds of ties, or only for soft wood, cedar, etc.?

Mr. Black—All kinds.

Mr. Campbell—What kind of a plate is it?

Mr. Black—Nothing, only a plate 6x8x¼-inch thick, made of steel, with a square hole in it for the spike. It is nothing r less than laying a plate on a tie and placing a rail on e and then spiking it.

ampbell—Giving it more bearing on the tie?

lack—Certainly, it gives you about four more inches on the tie than the rail does.

ampbell—The plate is to keep it from cutting through nd working into it?

lack—That is it, The ties are all right. It was on of the wear of the rail into the tie that the plates were , to prevent the wear.

ornell—How much larger are the plates than the piece

lack—The plate is 6x8 by ½-inch thick. The bearing of the rail is 4x8.

ampbell—Does not this make a rattle box of your train e plates get loose?

lack—The first plates we put on was in 1885 for about These plates were put down before we went to any pense to see if there would be any rattle. We found to occur, because the spike has a support in the plate does not have in the tie without the plate. One part ructure runs directly over the sidewalk and we have es in on that section. We do not find any rattle or noise from them; nothing but a rolling noise is heard. about to place them on our Sixth avenue line.

ampbell—You must have something on soft ties, of

resident—Certainly, that is the object of the plates, to rail from cutting into the tie.

lack—Yes, sir; we use the juniper and cedar ties. oved a failure for wear and tear. Where we use the old ties we have to edge off the ties, as it would not t the plate on a tie where the rail has worn in, for the st have an even bearing.

resident—We should like to hear from Mr. Offutt, now, ong Island Road.

W. Offutt—My friend, Mr. Black, has made a mis-regard to our road using creosoted ties. We have none , but are using many creosoted piles in bridge work.

We have a section of road we are now operating on which there is a trestle bridge 4½ miles in length. It runs through a portion of salt meadow, and also very deep water where the current runs strong. There was much trouble with piles in that particular portion of the road by reason of their rotting out and from the ravages of the toredo. We repaired this trestle this year, putting in over 1,800 piles, all creosoted.

The President—When you say "creosoted," are we to understand that that is made from dead oil?

Mr. Offutt—Yes, sir. We have another piece of pile work about 5,000 feet long over a similar meadow and bay where the toredo have eaten out the piles every year. Four years ago this trestle was rebuilt with creosoted piles and timber braces and we have had no further trouble.

In the ground work, in connection with our interlocking switch towers, where we use a large amount of plank and small size timber in horses, boxes and stakes, for the purpose of carrying pipe rollers and signal wires, I am putting in fernolined timber. We formerly used in that line untreated yellow pine, which did not last over three years, as it rotted out very quickly around the lag screws used in fastening the rollers on; causing considerable trouble and expense in keeping these intricate systems in proper working order. I have adopted fernolined timber in this kind of work, and have some in our interlocking system at East New York that has been exposed to the elements for about two years and there is now no perceptible decay.

The President—What preservative do you use for your cross-ties?

Mr. Offutt—I have none at all for them. We used spruce and yellow pine in boxes underground for our gate connections and crossings, which rotted out very soon, and we now make all renewals of this kind with creosoted timber.

The President—We will now take up the report of the committee on "Labor on Track." Mr. Jordan is the chairman of that committee. Mr. Jordan, will you please come forward?

LABOR ON TRACK.

Mr. O. F. Jordan—M. C. R. R.—This is rather short notice for a report of this kind. However, we have our report prepared and it reads as follows:

To the President and Gentlemen of the Roadmasters' Association of America:

GENTLEMEN—Your committee on "Labor on track, labor required under varying conditions and proper length of sections," first taking into consideration safety, and second economy, with this in view respectfully submit the following report:

To begin with, we divide the different roads into three classes:

1. Roads with heavy tonnage and fast trains.
2. Roads with moderate tonnage and fast trains.
3. Roads with light tonnage.

The objects of a Roadmaster (we may be allowed to point out) are:

1. To render the road as safe for the purpose of traffic as the attending conditions allow.
2. To bring up to and maintain it in as high a standard of excellence as possible.
3. To carry out the two preceding conditions at as little expense as would be consistent with safety and economy.

Firstly, roads should be divided into sections, as to the length of which your committee will refer later, each section to be under the control of a section foreman. As to the qualification of such a foreman your committee will say nothing further than to recommend that he should be intelligent, experienced, faithful, and capable of controlling the employees under him in such a manner as to cause as little dissatisfaction as possible and to perform the work necessary to his section, thoroughly and with dispatch.

All extra work, such as laying new rails, ballasting, putting in new tracks and switches, building new fences, etc., should be done with extra men.

The following table will give the kind of ballast, length of sections and number of men required under the varying conditions, as recommended by our committee:

SINGLE TRACK, FIRST CLASS.

Kind of Ballast.	Length of Sec.	No. Men.	Remarks.
Gravel, sand or cinders	5 Miles.	5	
Stone	5 "	7	
Loam	5 "	6	

DOUBLE TRACK, FIRST CLASS.

Kind of Ballast.	Length of Sec.	No. Men.	Remarks.
Gravel, sand or cinders	4 Miles.	6	
Stone	4 "	8	
Loam	4 "	6	

SINGLE TRACK, SECOND CLASS.

Kind of Ballast.	Length of Sec.	No. Men.	Remarks.
Gravel, sand or cinders	5 Miles.	4	
Stone	5 "	6	
Loam	5 "	4	

DOUBLE TRACK, SECOND CLASS.

Kind of Ballast.	Length of Sec.	No. Men.	Remarks.
Gravel, sand or cinders	4 Miles.	5	
Stone	4 "	7	
Loam	4 "	5	

SINGLE TRACK, THIRD CLASS.

Kind of Ballast.	Length of Sec.	No. Men.	Remarks.
Gravel, sand or cinders	6 Miles.	4	
Stone	6 "	5	
Loam	6 "	4	

The above number of men should be distributed during the diffe ent seasons of the year as the climate and circumstances require.

Your committee wish to urge upon the Association the very gre importance of having the best possible track. We are of the opini that a great majority of the railroad tracks do not get proper att tion, and that if a record should be kept to show the difference the maintenance of rolling stock and track material betwee rough and smooth track, we are of the opinion that greater at tion would be given the track department.

O. L. JORDAN,
A. B. ADAMS,
JOHN SLOAN,
W. F. ELLIS,
J. R. PATCH,
Comm

eport was accepted for discussion.

r. Cain—Does the number of men include the foreman?

r. Jordan—That includes all the men.

r. Ramsey—I would move that the report of the committee
taken up item by item and adopted in that form. The
al adoption of the report was merely to relieve the com-
e, I understand.

tion seconded and carried.

e President—You will please bear in mind, now, that you
scussing this report by sections and that it will be adopted,
ll, the same as the report on cross-ties.

Secretary proceeded to read the report by sections, as
s:

begin with, the report divides the different roads into three
:

Roads with heavy tonnage and fast trains.
Roads with moderate tonnage and fast trains.
Roads with light tonnage."

Cornell—The question is, What do you call "light ton-
?

President—I suppose, Mr. Cornell, that that would ap-
a road that had no through business, simply a local road?

Jordan—I should call "light tonnage" something like
ion tons, and "heavy tonnage" something like twenty
n tons, that is, the amount of tonnage during the year.

Cornell—The question asked was in regard to the heft
s also. You specify in your report "all roads doing a
traffic and roads that do not."

Jordan—I do not call 18 or 20 million tons a large traffic.

e first section was adopted.

e Secretary—The second point in the report for our con-
tion seems to be:

rstly, roads should be divided into sections, as to the length of
your committee will refer later, each section to be under con-
a section foreman. As to the qualifications of such a foreman
committee will say nothing further than to recommend that
ould be intelligent, experienced, faithful, and capable of con-
ng the employes under him in such a manner as to cause as
dissatisfaction as possible and to perform the work necessary
s section, thoroughly and with dispatch."

The President—Is there any discussion on the second section?

The second section was unanimously adopted.

The Secretary read the third section, as follows:

"All extra work, such as laying new rails, ballasting, putting in new tracks and switches, building new fences, etc., should be done with extra men."

The President—That is the third section of the report. What will you do with that?

Mr. Burgdorf—Union Pacific—Does that mean an extra gang in charge of an extra foreman?

Mr. Jordan—Either; if the Roadmaster sees fit to put on a new man on the section or an extra gang I do not think it would make any difference.

The third section was adopted unanimously.

The Secretary read the fourth section, as follows:

"Single track, first-class. Kind of ballast: Gravel, sand, or cinders; number of men, 5."

The President—The fourth section of the report you have heard, is there any discussion on that?

The fourth section of the report was adopted unanimously.

The Secretary read the fifth section, as follows:

"Single track, first-class; number of men, 7."

Mr. Cain—We used this kind of ballast with an extra gang. It is very easy to take care of it when put in. What we put in was with an extra gang, extra foreman and men, so that it is an easy matter to take care of it with a common gang, a man to the mile, commencing April 1st, and from that to July and to October 1st or 15th.

Mr. Jordan—The word "ballast" your committee consider from 4 inches up to 4 feet.

Mr. Ramsey—Is it generally understood more difficult to take care of a rock ballasted road than a gravel ballasted road? I have never had any experience with broken stone.

The President—The gentlemen using rock may be in the same condition as you.

Mr. Ramsey—Then why should they claim a right to more men than those who use gravel?

Mr. Cain—It costs more to change the ties. The easiest way is to line it before you tamp it. If you line first and then tamp it you form a new bed of stone under the tie, the only way I have found to hold it. If there is anyone that knows of any different way of doing I should like to know it. I have some good rock ballast. I line first and then tamp it afterwards, after the first year. What I mean is maintaining it after the ballast has been down. I mean raising it; it costs more to change this ballast than on rock. It is harder work to line on rock than on gravel. I think Mr. Hogan will testify to that.

The fifth section was adopted unanimously.

The Secretary read the sixth section of the report, as follows:

"Single track, first-class; earth ballast; length of section, 5 miles; number of men, 5," etc.

Adopted unanimously.

The Secretary—I would like to suggest to the chairman of the committee that he state at the head of the table that these are averages for the year. I understand that is what is intended.

Mr. Jordan—Yes, sir; those are intended for the averages.

The Secretary read the seventh section of the report, as follows:

"Double track, first-class; gravel, sand or cinders; length of section, 4 miles; number of men, 6."

Mr. Stearns—C. L. & N. W. R. R.—I would take exception to that, if a man to the mile on single track, why not a man to the mile on double track? In clearing the roadway of weeds and brush we have one more mile to make, and it makes more work in that particular line than on the double track. On the other hand we found there was much creeping, and that must be overcome, and I would say we need one man to the mile on double track as well as on single track. I think eight men would be correct.

Mr. Hickey—M. C. R. R.—My experience is that I would as soon take care of four miles of double track as five miles of single track.

The President—Do I understand that you wish to amend the seventh section?

Mr. Stearns—Yes, sir.

Mr. Ellis' amendment was rejec

Mr. John Sloan—Mr. Stearns s
clean on double track than on
stand that. As a general thing
have more trains than on singl
double track is reduced proportio
tion the length.

Mr. Stearns—You are mistake
work on a single track than on a
yet the work is as great and gr
the fact that you have to take care
which more than offsets it, and
every spring where the rails have

Mr. Courtney—It is my opinion
track road per mile, with the
track, is fully one-third more pro
work is concerned, without rega
weeding, etc.

Mr. Patch—Conn. River R. R.
anything on this subject at all bec
it is not such a report as suited m
and I will let you gentlemen car
come to whatever conclusion you

on a single track. The weeding of track is another item at comes in, and they exact a little more when they have any trains. There are many things that come in that have come out of your legitimate track gang, and for that reason ffered the resolution of three miles and a man to the mile.

The President—We should be glad to hear from Mr. Burnett.

Mr. Isaac Burnett—I have had experience with double track I find that double track varies as much as any other. We e sections averaging four miles, some a little more. I am aking of the Rock Island Road now, as that was where I ld the fort" for twenty years. From my standpoint, I not agree with the gentlemen who made that report. For the ntenance of *first-class* track with gravel ballast I would say s, for a double track road give each section four miles, as r as possible, and eight months of the year, counting 26 king days to the month, would give you

208 working days, 6 men per day	1,248 men
months—104 working days, 3 men per day	312 men
Total number of men	1,560
Total days worked	312

ich would give you on four miles of double track an average ve men per day or five-eighths of a man per mile of track; the same rule applies to single track of six-mile sections, an rage of five men per day, including the foreman in each e. I am quite confident that a good track can be kept up h that number of men. I know that my reports will show than that for many years. Managers of railroads often, ough real or imaginary cause for economy, reduce the track or below a standard, and the track is by such reduction wed to decrease from day to day, and I deem it false econy. It will cost 50 per cent. more to put track up after it is wed to get down than to keep it up after it is well put up; all know that. I would like to see a statement from each admaster now present of his section expense from October 1887, to September 1st, 1888, and a comparison made with ch month of 1887 and 1888, thereby showing whether he has creased his expense or increased it. I think each one should ring such a statement to the next meeting. I have run secions of four miles of double track and six miles of single track four months in the winter with two men and a foreman, and successfully, too.

Mr. Cain—Well, do you expect any track work from those men?

Mr. Burnett—Those men work, and don't you forget it!

Mr. Cain—Just simply patrol the track?

Mr. Burnett—Do everything that is needed to be done.

Mr. Cain—What time of the year was that?

Mr. Burnett—In winter season, of course.

Mr. Cain—Was it in snow or ice, or was it an open winter?

Mr. Burnett—When we have been bothered with snow we immediately proceed to clean our track regardless of expense. We have never kept a big gang of section men waiting for a snow storm.

Mr. Cain—Then the work should be charged to the section.

Mr. Burnett—No, sir. No work is ever charged to the section, except such work as rightly belongs to it. It is charged to "snow expense."

Mr. Patch, J. R.—Conn. Riv. R. R.—If you will allow me to say a few words I will tell you how we do our work on the Connecticut River Road. We know our superintendents and general managers wish us to give them a smooth, good, riding track, also to do our work as economically as we can. On our road we run 5½ miles for a section on double track and 6½ miles on a single track. I think we have a very good track, averaging with some of the older roads in Massachusetts, and we averaged for the last five years just three-fourths of a man to the mile of track, counting a double track, one mile the same as two miles, and including foreman. I commence in the spring of the year as soon as the ground gets dry. I put on as many men on each section as a good foreman can work to good advantage. I intend to get my work in shape by June 1st or July, and then reduce my help to four men and run them to the middle of October and then increase about three men on a section and run them four or five weeks and get the road in good shape to lie up. In the winter we have four men to 5½ miles of double track.

Mr. Stearns—The average for labor is the same per mile on double track as single.

:h—No, sir; on a double track it does not average ourths of a man to the mile, and we can do the r on a double track road than on a single track, for t such long sections nor as far to run, and we can one track to the other and the men do not lose time; ; a double track you can step from one track to the lose no time.

'arthy—Do your men remain idle all the time on a k if the train is behind?

:h—We do not always. We always take two tracks ther.

iothy Hickey—Michigan Central—I would recom-)uble track section to be four miles and to use 5 h section from April 1st to November 1st, and from November to the 1st of April 4 men. I think the)e kept in first-class condition with that force, and vork to be done by the extra gang. We use gravel f course that would include the foreman with 5 men.

kson—Many years ago I took care of the double st as good gravel as anywhere in the country out of and our aim was to work five men on an average the d, and we maintained a very fair track, with the -pound rail, and we had iron, not steel. The speed is in those days was from 20 to 30 miles an hour, ·ight trains from 12 to 15, and with five men, averag- ır around, including the foreman, we were enabled ı and keep a clean, nice, riding track with the iron l.

sident—We will put the seventh section.

carried, only one dissenting voice.

·tary (reading eighth section)—"Stone, four miles and his is the double track, first-class, stone ballast.

ection carried unanimously.

:tary—The ninth section reads: "Length of section, 4 ber of men, 6."

a P. Ramsey—C. H. & D. R. R.—That is one of the ings of the report: here the company are expected e expense of rock ballast and then to put on more

Mr. Cain—We are maintaining a strictly first-class road with rock ballast, not dirt.

Mr. John Sloan—If the gentleman ever figured on any track he knows that on dirt track three men will do as much as three on gravel.

Mr. Cain—My experience is that one man on dirt ballast is equal to two men in rock.

Mr. Ramsey—Then if you can get a first-class road with dirt ballast, why do you go to the expense of rock?

Mr. Cain—We are talking of a first-class dirt road; and we mean a road well ballasted.

Mr. Ellis—Perhaps there may be some dirt ballasted roads in some parts of the country where they cannot get any rock ballast, and it is the intention of the report to provide for those roads. I think that is what this clause in the report is for.

Mr. Houghton—L. S. & M. S. Ry.—Can a dirt ballasted road be made first-class?

Mr. Reed—S., F. & W. R. R.—I will answer the gentleman yes, it can; I think that Mr. Ramsey's remark is worthy of careful consideration by this body. If it is a fact, as this committee reports, that it if requires more labor on a rock ballasted road, what is the use of having a rock ballasted road?

Mr. James Sloan—C. & E. I. Ry.—We can have a first-class road for one month or six weeks in the spring, when it heaves from the dirt from a foot to 18 inches, whereas if you have from 12 to 13 inches of broken stone you have a first-class road the entire year. That is the difference between a first-class stone and a first-class dirt road in all seasons of the year.

Mr. J. A. Perry—Virginia Midland—My experience is with rock ballast, that you have a first-class road the year around. and with a dirt road you can have a first-class track only part of the time, even where we have no frost. We go over the track when down, and go over it quickly, and we have good track again, but it does not remain this way, and first-class dirt track only remains first-class about six months in the year.

Mr. Burgdorf—Union Pacific—I think, if I understand the report correctly, a first-class road is one of heavy tonnage and fast trains, and a second-class road is one of moderate tonnage and fast trains.

Mr. Jordan—That is it, exactly.

The President—Mr. Burgdorf, what kind of roads have you Colorado?

Mr. Burgdorf—We have all dirt roads, and I have seen a little tter track there than out here, and we can maintain our ck the year around. Our ground is dry and we have gravel l sandy loam, and we maintain our track well the year und. I maintain a first-class dirt track as well as you would st-class stone track.

he President—You must remember, Mr. Burgdorf, that if go to Colorado we will inspect your track closely.

r. Burgdorf—Yes, sir; and we will show you as good a k as any in the East. My track has only cost $30 to the e for the last five years, and that also includes laying the ole division with new steel, and that must be considered a y reasonable figure. In the winter season we get very nomical and run our section with our foreman. Our sections are 6 miles and 6½ miles in length, none longer than 6½ les. In the summer time we have four men for about 5 months, d in the winter time one man and a foreman, and sometimes foreman alone, when he rides a pony and tightens up the lts, etc.

Mr. Courtney—L. S. & M. S.—And in case of broken rails, ow does he change them if he has to send a flagman out to op the train, etc.? [Laughter.]

Mr. Burgdorf—Why, he protects these dangerous places in ne direction while one man is going in the other.

Mr. Patch—Conn. River R. R.—Our brother, Mr. Stearns, asked the question here of this convention why it took more men to take care of a piece of stone ballast than gravel ballast. I supposed there were gentlemen here who had had considerable experience in stone ballast and who would answer that question. I have had no experience myself with stone ballast, but we run in connection with a road that use stone ballast. Now regarding the work, speaking, in the first place, of the renewal of ties, I think five men in gravel will put in more ties than eight men in stone ballast, because they must use the pick and in many cases pick the stone with their hands and throw

Mr. Cain—It requires the extr
One man will do more work in gra
ties.

Mr. Hyland—Admitting that fa
ment, you do not change your ties
years.

Mr. Cain—We have to renew th
change them all at once.

Mr. Perry—Vir. Midland R. R.—
ing the track, on rock ballast it
when you have the men on their k
men will clean more in dirt than te

Mr. Stearns—Well, I should thir
difference in the amount of weeds
root than on rock ballast.

Mr. Perry—Well, in our country
the rock.

Mr. Hyland—The claims of the r
sociation were that the weeds did
that they did not have any weeds t

The President—How much rock

Mr. Hyland—We have no rock
men in our Association who have
been their claim

re in, with rock ballast, the work is not required with us is necessary with gravel ballast, and I think the number en is still in favor of gravel ballast on account of the men ng to go over their work so often, while on the stone ballast lo not find that necessary.

r. Cain—As I understand it, you must dig low enough so the tie will lay up solid with the rail and that you can half a dozen in gravel where you can one in rock.

r. Ramsey—Don't you have to tamp your gravel ballast?

r. Cain—But it don't take so long to tamp it. Certainly, st as they get loose they must be tamped up.

r. Thurston—C., St. P., M. & O.—I have thirteen miles of ballast, and find that it is much more work to keep it up on the other, but when I get my ties in eight men will not up as much of that as four men on the gravel ballast, and n I go away from home I am not afraid of its washing out, that is why the company is willing to put in rock ballast, ough it costs more, because it is safer to run trains on and et over the road in better shape and have a better track inter than we do on our gravel roads.

r. J. M. Jackson—J. S. E.—I will state what I am doing . I have about 300 miles of road of dirt and sand. It is water-washed sand, but wind-drift sand, and I am working men and a foreman on seven and one-half miles, and am able to maintain a tolerably fair track from the fact that t steel I have is steel we used on the Wabash, twelve thirteen years old, and has stood a heap of hammering. then I have 126 miles of old rail, laminated pretty badly, with all my change of rail and putting in ties I have been led to maintain a track with passenger trains thirty miles our over it. Of course, it is not strictly first-class, yet I d make it so if I had good rail. I think the committee has e the proper recommendation regarding double track, and it should be maintained with the number of men specified e report. I come very near doing it on a single track.

Jordan—I do not know much of the earth ballast myself. eport is made from the experience of other members of mmittee. I was thinking that it might be well to have d "loam" ballast instead of "earth." I think the word "loam" was mentioned by other members of the committee, as well as by myself, at least the word was mentioned in regard to ballast in the prairie countries, and I think it might be well to change the word to "loam."

The President—Then, if there is no objection on the part of the committee, we will change the word "earth" to "loam" in the report.

The change was made by the Secretary.

Cries of "Question," etc.

The ninth section was adopted unanimously.

M. Courtney—L. S. & M. S.—I would offer the following:

Resolved, That the report of the Committee on Labor on track be recommitted to the committee for report at the next annual meeting, and that a copy of the report be furnished by the Secretary to every member of the Association, and that the members of the Association be requested to furnish the committee with all the information possible on this subject.

Seconded and carried.

The President—The next business in order is miscellaneous, but before we pass to that we have some other matters to consider. Members of the Roadmasters' Association of America, it is with profound regret and sorrow that we have now to perform the duty of presenting resolutions upon the death of Mr. Charles Latimer. He was so well known to you that I need not say more than to announce the report of the committee. He was so well known and highly regarded by the Roadmasters of America, and by all railroad men, that to mention his name is simply to engage your affection and regard, and we now have to perform the duty, the last act we can perform for him, in presenting the report of the committee on his death. Mr. S. L. Swinney, chairman of the committee, will now read the report.

Mr. Swinney—W., St. L. & P.—read the report of the committee as follows:

To the Officers and Members of the Roadmasters' Association of America:

Since last we met—one year ago—in the beautiful Forest City, he whose kind words and gentle voice welcomed us to Cleveland has been stilled in death. The spirit of Charles Latimer, on the morning of March 25, 1888, winged its way across the dark river to th

eyond, and one of the greatest and best of America's tracks-
ased his labors.
Latimer was born in Washington, D. C., in 1827, and in 1854
d the railroad service as roadman on the Mobile and Ohio
d, rising to the position of assistant engineer on that road, and
hat time to the day of his death he was employed in con-
ion or maintenance of some of the best roads in America, in
rious offices of assistant engineer, chief engineer and superin-
nt of maintenance of way. During the time he was chief
eer of the Atlantic and Great Western Railway, now the New
, Pennsylvania and Ohio, he laid the foundation of our present
ciation, having his roadmasters, some ten or twelve in number,
annually with himself and discuss all questions of track, and
suggestions were always welcomed and weighed. His last
le written for the public was an appeal for "A Day of Rest for
Veary Trackman," thus closing up his life with an appeal for
with whom the best days of his life had been spent, and whom
ad on many occasions demonstrated that he truly loved.
ough practically not a member of our Association he had at-
ed so many of our meetings, and took so lively an interest in
roceedings, and was so thoroughly identified with track work
is life, that reverence for his memory becomes the property of
and while we deeply deplore his death we humbly bow to
will of the Infinite and unite in tendering to his family and
ds our condolence and sympathy. It will be our aim, as well
uty, to emulate the virtues of him who died as he had lived,
id of an enemy in the world; but honored, respected and loved
at great army of men composing the track workers of America.

S. L. SWINNEY,
H. W. REED,
R. CAFFREY.

r. H. W. Reed—I move, although as a signer of this report
ay be not strictly in order, that the report be received and
ed in the minutes of our proceedings, and that a blank page
ft in our proceedings in memory of Mr. Charles Latimer;
that a copy of these resolutions be furnished to his family.
onded.

. John Sloan—I move that all members of the Roadmas-
Association rise in adopting this resolution.
onded
l the members of the convention arose.

IN HONOR

OF

Mr. Charles Latimer.

e President—We will now take up whatever miscellaneous
ers the Association may desire to present—if there are

. H. W. Reed—The committee having in view the enter-
ment of the ladies desire to know how many ladies will go
.e excursion to Mt. Vernon to-morrow, and in view of this
st I would respectfully ask the members who desire to
d the excursion and to have their ladies accompany them
kind enough to hand me their names on a card or slip of
that it may be known to the gentlemen who have this
tainment in charge how many must be provided for.

e President—The object is to provide a lunch for the num-
hat is going, and this request is made in order that the
nittee may not be called upon to provide more than is
sary.

. John Sloan—I move that the names of all the ladies
ding this convention be entered on a list and incorporated
r proceedings, the same as was done one year ago.
onded by several and carried unanimously.

e names of the ladies attending the convention were as
rs:

List of Ladies in Attendance Upon Convention.

Irs. A. B. Adams,
Irs. G. M. Archer,
Iiss Lula Burnett,
Irs. C. H. Cornell,
Iiss Mary Caffrey,
Iiss Anna Courtney,
Irs. W. H. Courtney,
Irs. G. E. Cain,
Iiss Emma Cain,
Irs. Garrett Davis,
Irs. A. J. Diddle,
Irs. W. G. Diddle,
Irs. Thomas Dickson,
Irs. Helen Dickson,
Irs. L. Flynn,
Irs. J. K. Geddes,
Mrs. A. T. Hay,
Mrs. Thos. Hickey,
Mrs. J. A. Kerwin,
Mrs. Chas. Melville,
Mrs. D. McEntaffer,
Mrs. D. A. McGee,
Mrs. W. L. McGarr,
Mrs. J. H. Preston,
Mrs. H. W. Reed,
Mrs. John Sloan,
Mrs. T. L. Snyder,
Mrs. M. A. Stafford,
Mrs. D. Shehan,
Mrs. S. L. Swinney,
Mrs. James Sloan,
Miss Mary Sloan.

Mr. Cornell—C. M. & St. P.—I would move that we meet this hall to-morrow morning, at 9 o'clock, after adjourning t night.

Seconded and carried.

The President—We will now take up the matter of the election of officers for the ensuing year. We will begin at the bottom of the list and work up, as we did at Cleveland one year ago. The first to be elected will be a member of the Executive Committee. Mr. C. H. Cornell of the C. M. & St. P. Ry. was elected at our last annual meeting.

Mr. J. H. Preston—C. R. I. & P.—I would put in nomination Mr. Chas. W. Burgdorf, of the Colorado Division of the Union Pacific Railway, as a member of the Executive Committee.

Mr. R. Black, of the M. E. R. R., was also nominated.

Mr. John and James Sloan and Mr. W. H. Stearns were appointed tellers by the chair.

The first ballot resulted as follows: Mr. Black, 36; Mr. Charles W. Burgdorf, 14. Mr. Robert Black, of the Manhattan Elevated Railway was declared elected a member of the Executive Committee for a term of three years.

The President—The next business in order will be the election of a Secretary and Treasurer for the ensuing year.

It was moved, and seconded by several, that Mr. H. W. Reed, of the S., F. & W. Ry., the present incumbent, be elected by acclamation.

Motion put and carried unanimously.

Mr. H. W. Reed—Mr. President, Ladies and Gentlemen: It affords me great pleasure to receive this kind acknowledgment at your hands, and all I can say to you in return is, although did not seek a continuance in office nor expect a reëlection as your Secretary for the coming year, for the duties are ver arduous, yet I will accept the office for one more year an endeavor to perform the duties to your satisfaction. [Applause.]

The President—The next officer to be elected will be t Second Vice President.

On motion of Mr. Preston, Mr. James Sloan, of the C. I. R. R., the present Second Vice President, was reëlected u imously by acclamation.

President—We now come to the nomination of the First President.

Isaac Burnett, of the Joliet Steel Works, the present inent, was unanimously reëlected by acclamation.

President—The next nomination in order is for Presifor the ensuing year.

Isaac Burnett (taking the chair)—Mr. President: I move ct, by acclamation, our present President, Mr. J. W. Craig, C. & S. R. R. (Seconded by many.) We do this for the n that we have known our worthy President for the last ears, and looking at it from a railroad standpoint—a mathich Roadmasters all understand—you all well know that have a man that "fills the bill" and does his work well not wish to part with him, and for that reason I put in ation for reëlection our present worthy President, and that Mr. Craig will accept of the offer and not decline or take in any way, shape or form to make any excuses. applause.]

J. W. Craig (the President)—Gentlemen and Ladies: It ot seem that it would be right or proper for me to decline omination, for I feel it my duty to serve you to the extent ability, as it should be the duty of every member. While nber of this Association I have endeavored to please you d am glad, if what has been said is true, that I have sucd in doing so. Now, in nominating me for your President e coming year you do not do the right thing, for this rea-Our Association numbers now 342 members and there are r cent. of this number from the West. Now, I have been President for two years, and would very much like to see gentleman from the West elected for the coming year. I earnestly aid you and do all I can to further the interests Association, which I certainly have at heart, and, theregentlemen, with your kind permission, I will place in nation Mr. Adams—Mr. A. B. Adams, of the Wabash, St. & Pacific. Mr. Adams is a Western man, and—

A. B. Adams—You will please excuse me, Mr. President. are all satisfied with you, and I very respectfully with-; I decline the offer.

Mr. J. H. Preston—C. R. I. & P.—We all know Mr. Craig, and that he has done well for us; he has been an honor to our Association; we all honor him as our President. It is true that he resides in the South, and it is also true that our next meeting will probably be in the Far West, and it will if I can do anything to get it there. [Laughter.] Our constitution says that any of our officers may serve for a term of three years. Our worthy Vice-President served us, and served us faithfully, for two years; he worked hard for the interests of the Association, as we know Mr Craig has done. Now, we know it will be necessary for us to have a change one year from now, and do not let us think of making the change until we are obliged to make it; let us hold to him in good railroad style. I would say nothing against Mr. Adams, neither would any other member; I am satisfied that he would make an excellent President: yet the time for a change in our general officers, I think, will not arrive until our next meeting. If I am alive I shall attend the meeting of this Association next year, and shall probably do so as long as I live, and then it will be time for us to talk of a successor to our worthy President. And now, Mr. Craig, I think we have all decided that you must hold on to this position for another year, and next year we will consult with you and get our heads together and try and catch some man next year in the North, or West, or in the central part of the country, for a change, who will make us a good President. and then, and not until then, shall we be obliged to part with Mr. Craig as our President. We must honor his judgment, and not be uncouth or rough with him. But we sincerely hope and trust, Mr. Craig, that you will serve us for one more year, and therefore, on behalf of the Association, it being their unanimous wish, I would ask you to withdraw your declination. We hope you will do so; you are the unanimous choice, and it is the sincere desire of this convention.

Cries of "Question," "Question," etc.

Mr. Burnett (in the chair)—It is moved that the rules be suspended and that Mr. J. W. Craig be re-elected President of this Association for another year. All those in favor of it will say "Aye."

One long unanimous "Aye!"

. **Craig**—I find that words are inadequate to express my
ks to you for the honor conferred upon me in again elect-
ie your President. I will promise you one thing, that I
lo in the future as in the past, and railroad men, as you
now, must always obey orders. With these few remarks I
ccept the office for one more year. [Loud applause.]

e **President** (Mr. Craig) in the chair—The next thing in
will be the selection of the next place of meeting.

. **John Sloan**—I move we hold our next annual meeting in
er, Colorado.

onded by many.

. **Jackson**—I would name St. Louis, Mo., as a more central

icago, Omaha and Chattanooga were also named.

. **C. W. Burgdorf**—Union Pacific—Gentlemen: I will tell
what we will do for you if you will come to Denver, Colo-
and hold your annual meeting: The General Manager of
nion Pacific will give you a train which will take you to
mountains. We will take you over the Marshall Pass,
gh the mountains and back to Denver—a three days' ride.
itizens of Denver will be right pleased to see you all, as
tters brought here to you will testify. I sincerely hope
ill agree to come to Denver, the cleanest and most beau-
ity in the United States. [Applause.]

Burnett—I move, as we continue our balloting, that the
aving the least number of votes be stricken from the list
Denver is left. [Laughter and applause.]

first ballot resulted as follows:

enver, - - - - - - - - -	44
hicago, - - - - - - - - - -	6
maha, - - - - - - - - - -	1
hattanooga, - - - - - - - - -	2

ver, Colorado, was therefore selected as the place for
g the next annual meeting of the Association.

President—The constitution and by-laws provides that
l be held beginning the second Tuesday in September.
r, gentlemen, the next business in order is to decide upon
hall be done in the matter of printing the proceedings
s convention. I desire that the Association should settle
atter.

and by-laws, which does not fix
Treasurer, I should be glad to ha
the Association.

Mr. Swinney—Does that amou

The Secretary—(M. H. W. Ree
me.

Mr. Swinney—I move that th
Treasurer for the ensuing year be

Seconded by several and carrie

Mr. J. R. Patch—Conn. River-
behalf of a few members of the
Association to offer you our sincer
ing we have received from the
Association.

The President—This is from Mr
England Roadmasters' Associatio
ciation I will say that it has giv
with you, and that we hope you
annual meetings and that you
believing that the intercourse be
only be pleasant but profitable to

And now, the ladies, will you
Roadmasters' Association to than
ence here at our annual meeting.

Thursday's Session.

THURSDAY MORNING, September 13, 1888.

The convention was called to order at 9:20 A. M., President Craig in the chair.

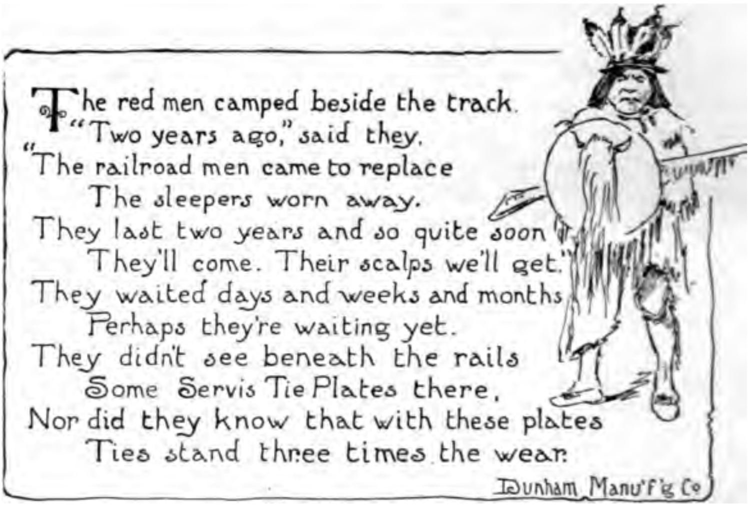
On motion of Mr. Isaac Burnett, a vote of thanks was extended to the agents of the manufacturers present at the convention for their kind invitation to take the trip to Mt. Vernon, which was to be made immediately upon adjournment.

Mr. Richard Caffrey, of the Lehigh Valley Railroad, invited all members of the Association and their wives to a ride over his railroad, for which a vote of thanks was extended.

Mr. C. W. Burgdorf, of the Union Pacific Railway, was appointed "a committee of one" to make the necessary arrangements for the next annual meeting, to be held in the city of Denver, and the Secretary was instructed to make suitable reply to the communications of the Governor of Colorado, the Mayor of Denver, and the Chairman of the Board of Trade of that city, acknowledging their invitations, returning thanks, and notifying them of our acceptance.

The Association then adjourned, to meet in the city of Denver, Colorado, on the second Tuesday in September, 1889.

SERVIS
RAILROAD ◆ TIE
PLATE.



The red men camped beside the track.
"Two years ago," said they,
"The railroad men came to replace
The sleepers worn away.
They last two years and so quite soon
They'll come. Their scalps we'll get."
They waited days and weeks and months
Perhaps they're waiting yet.
They didn't see beneath the rails
Some Servis Tie Plates there,
Nor did they know that with these plates
Ties stand three times the wear.

Dunham Manu'f'g Co.

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Outwear Any Hard Wood.

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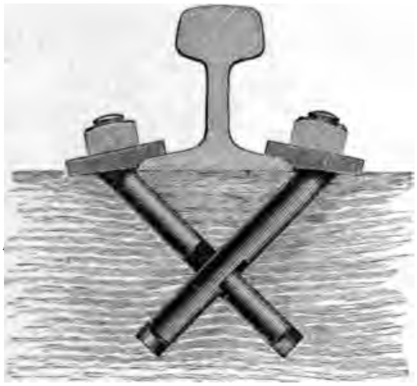

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Against rail spreading and derailments from broken rails. In use on 30 different roads, and approved by some of the most eminent R. R. officials in the United States.

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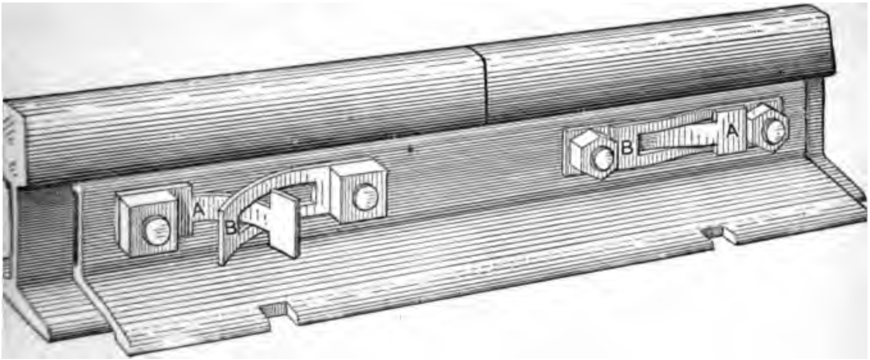

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Has been thoroughly tested without one case of failure.
Saves its first cost annually in cost of maintenance of track.

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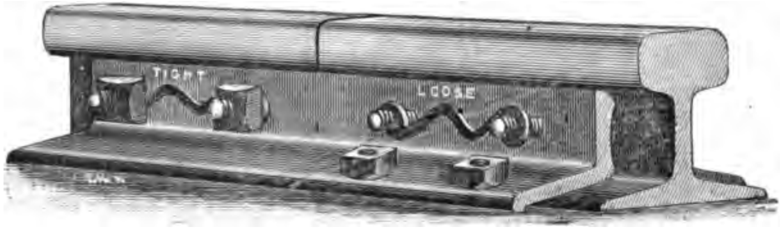

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These Nut Locks have been adopted by the New England Roadmasters, in Conventions held at Hartford, Conn, October 19th and 20th, 1887, and Boston, Mass., August 15th and 16th, 1888, as the Best Nut Lock Known.

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REFERENCES

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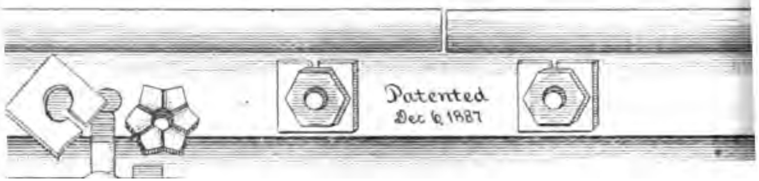

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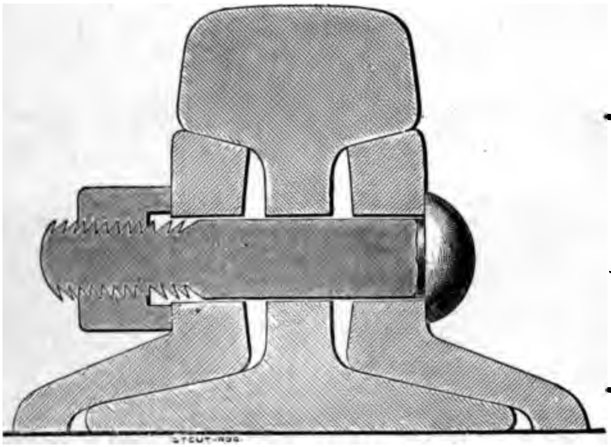

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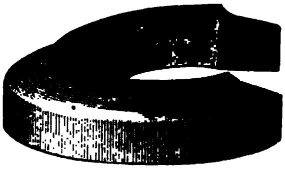

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SIMPLE, EASILY APPLIED.

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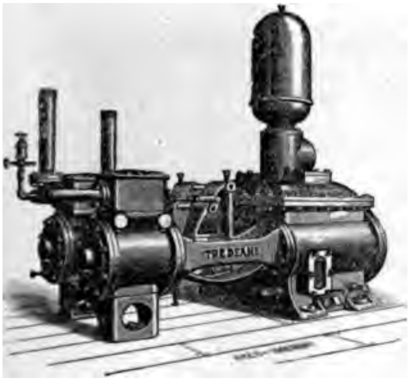

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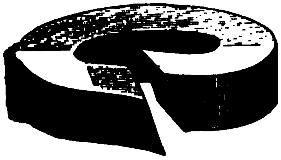

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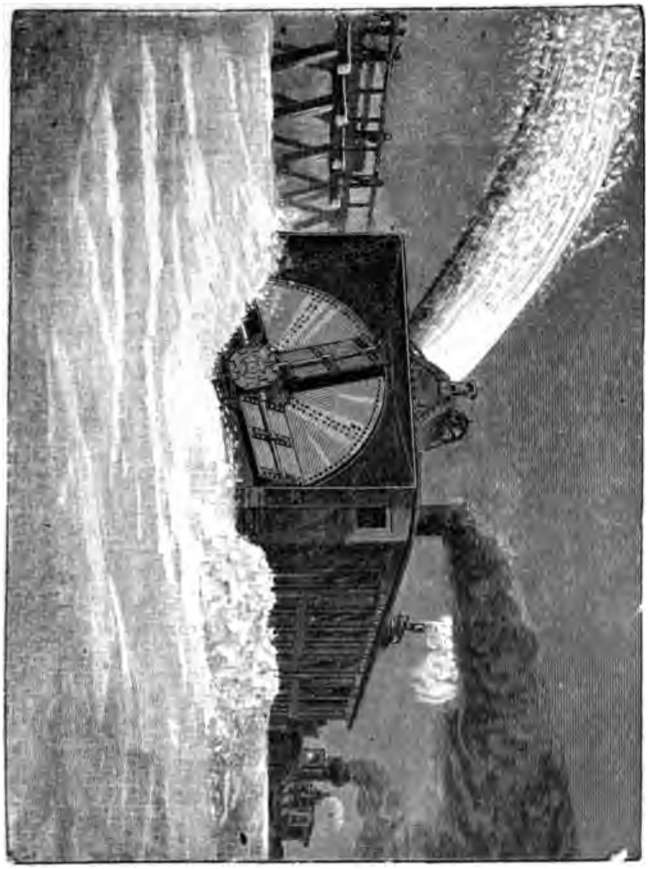

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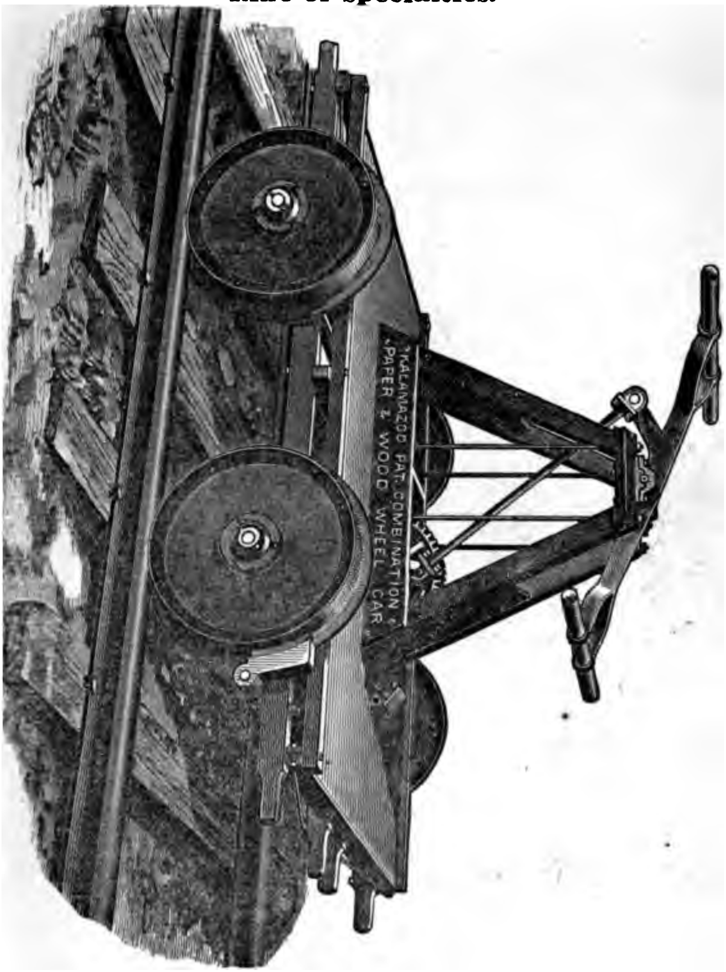
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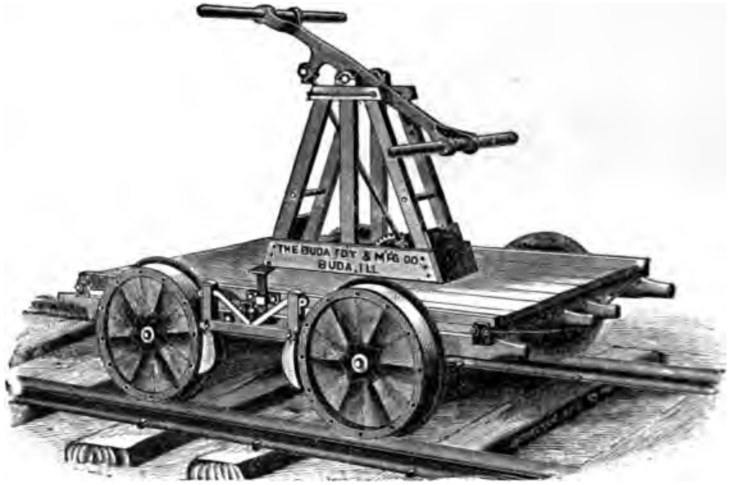
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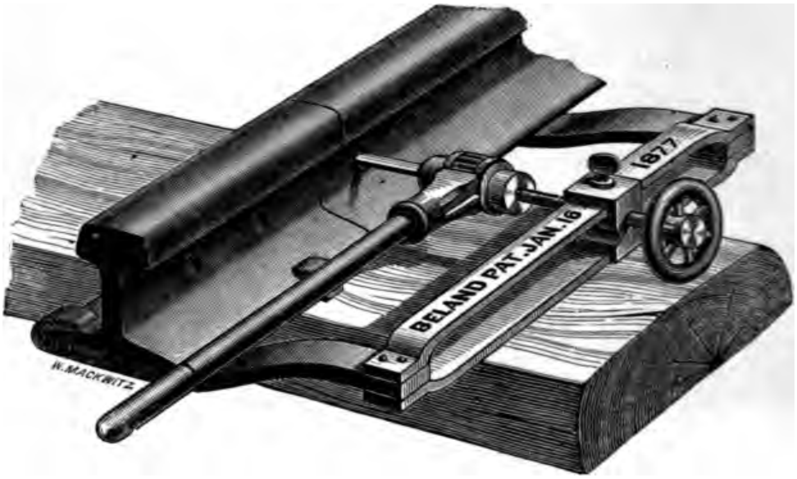

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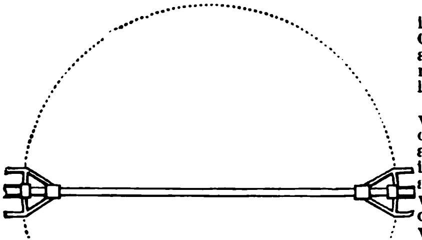

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We are prepared to furnish Gauge with wood connecting bar instead of iron tube, when so desired.

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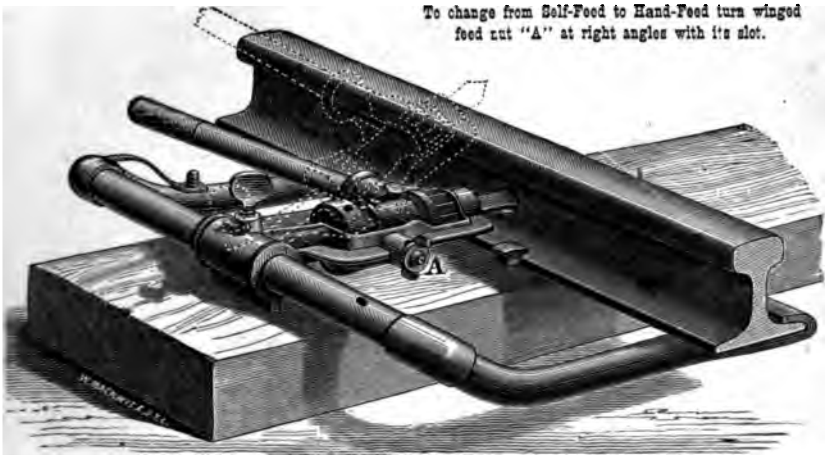

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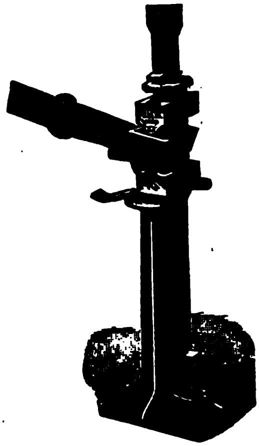

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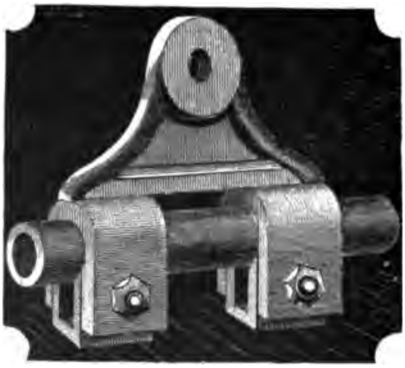

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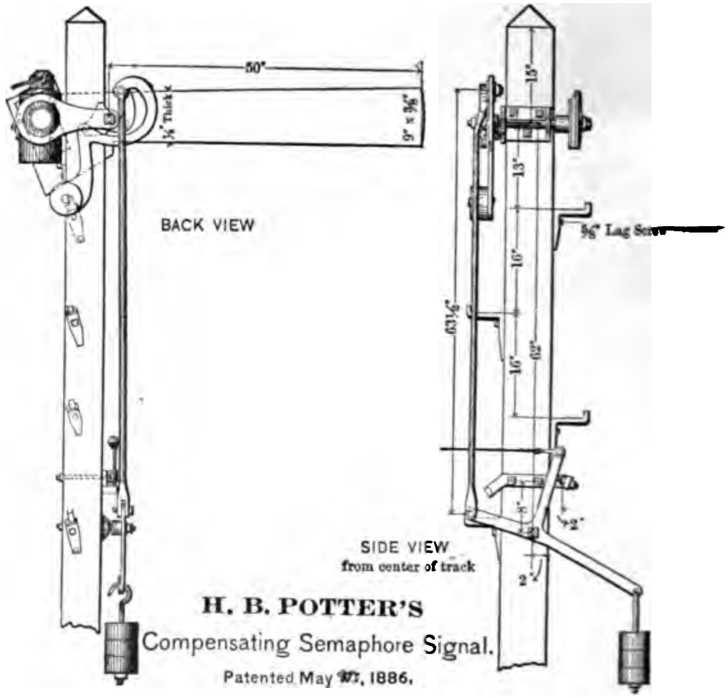

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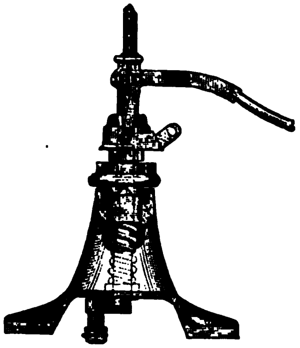

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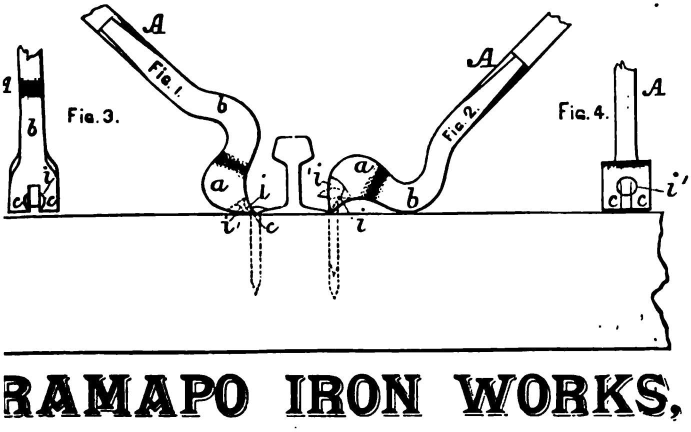

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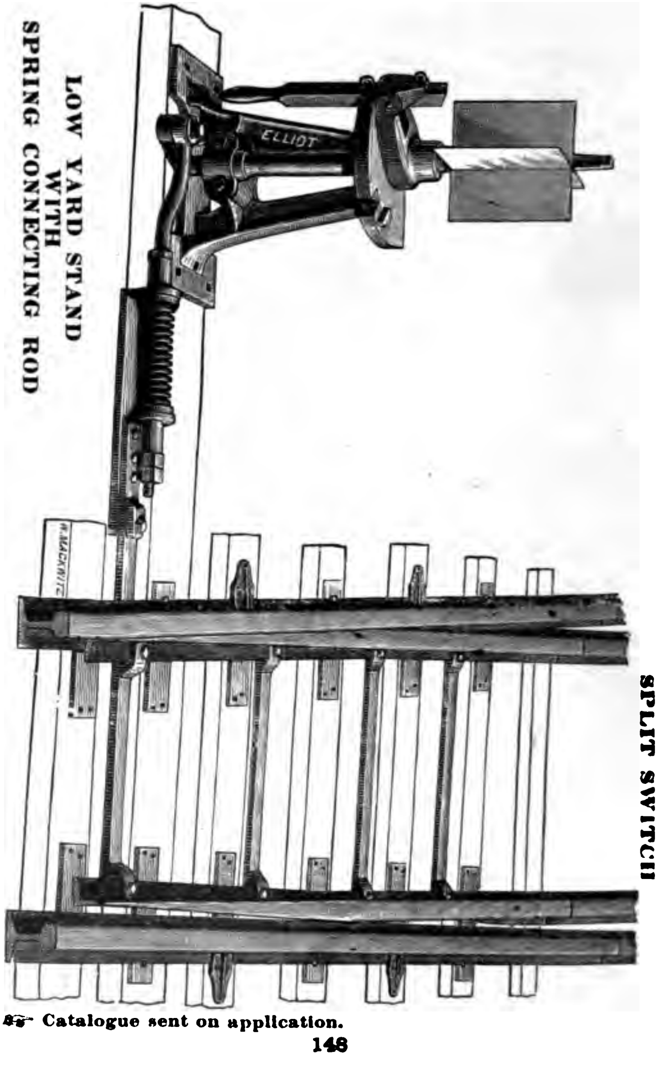

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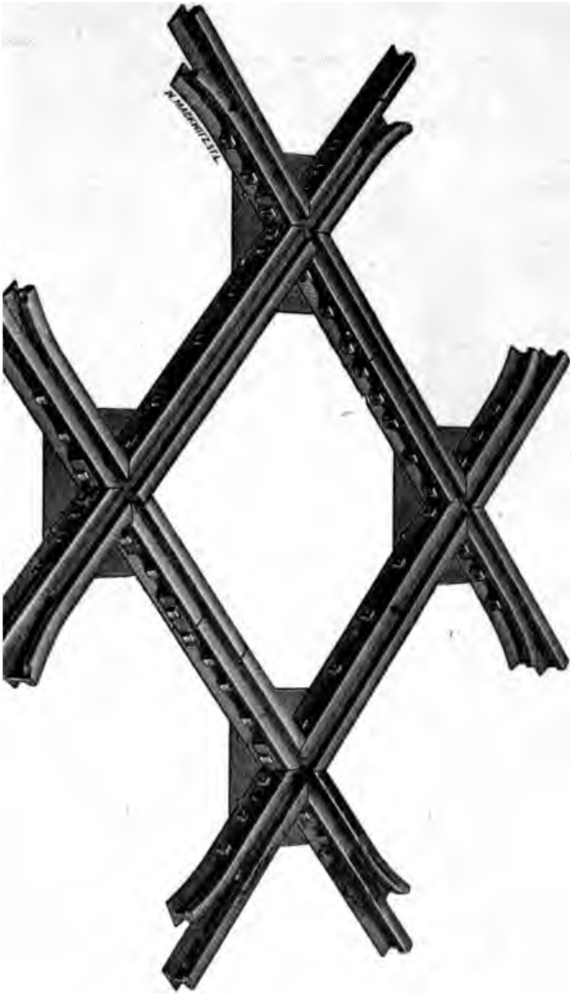

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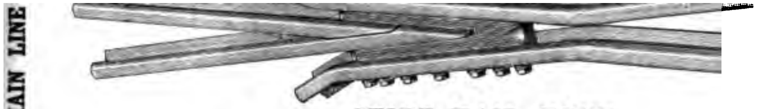

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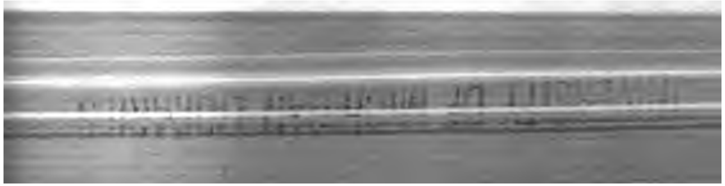

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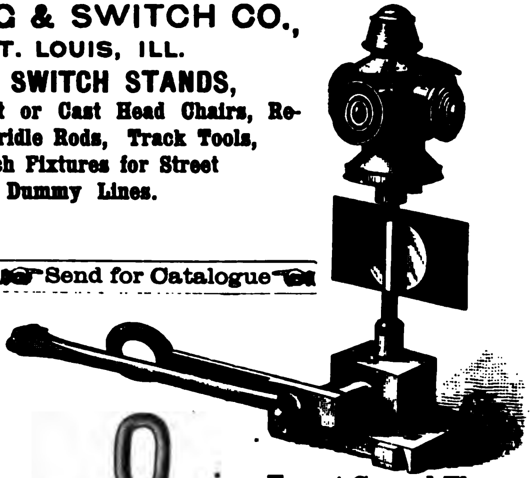
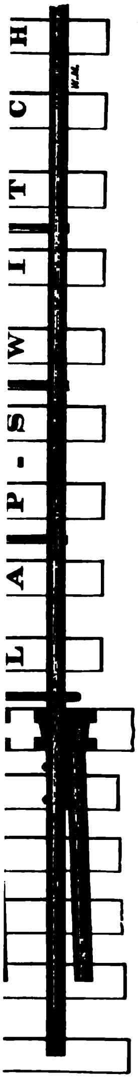
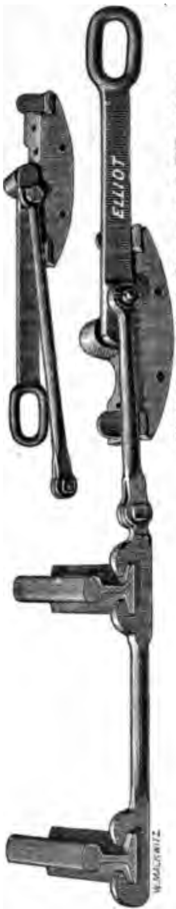


Target Ground Throw





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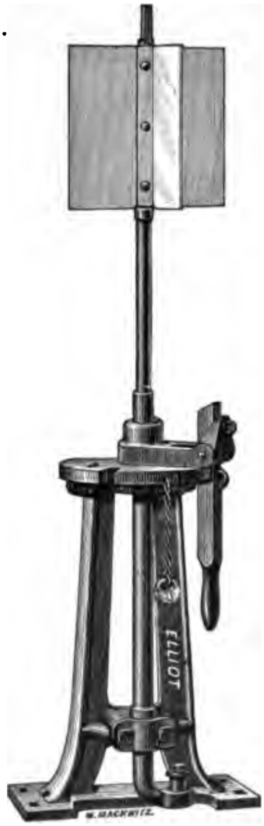
Stub Rods.



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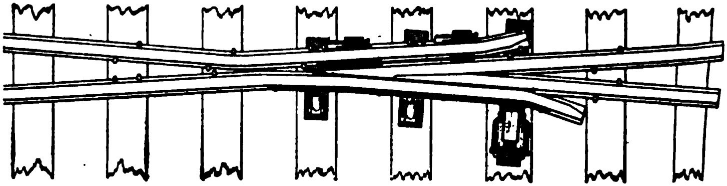
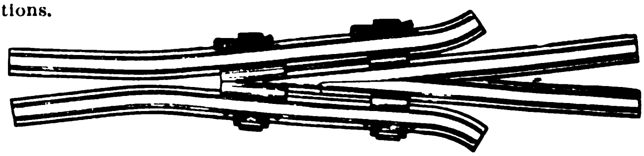
PENNSYLVANIA STEEL CO.

STEELTON, PENN'A.



This Spring Rail Frog is claimed to surpass all others in Safety, Strength and Durability, Noiselessness and convenience of placing and maintenance. Is not expensive, and in main line tracks is the most economical Frog that can be used. The fixed parts are tightly bound together inside of strong clamps, which are so interlocked and secured that they cannot work out of place, are much stronger than any other means of fastening the parts, and may always be tightened as the parts wear, so as to keep everything snug and solid, and avoid rattling. The spring rail is guided and kept in place by the strongest and most efficient devices in use, the spring rail being strengthened and secured against breaking. The peculiar form of the spring rail provides for all condition of wheels the most secure and effectual bearing and support ever attained in Spring Frogs.

The special improvements relating to the Spring Rail are also applied in various patterns of Bolted and Rivet Spring Frogs for parties ordering such constructions.



The **PATENT KEYED PATTERN STIFF** Frog continues the favorite Ri
Frog, and is sold more extensively than any other pattern of Rigid Frog. I
of the strongest possible construction, simple and reliable, easy to place and k
in condition to obtain the utmost durability of the steel rails of which it is m

STIFF FROGS, of various RIVETED PLATE, and BOLTED, PATTE
are also supplied to many roads, and our facilities for making them, at favo
prices, are not surpassed. Various methods of fitting, as preferred.

CROSSING FROGS, of every required angle, are constantly produc
large numbers; some, of the most complicated character. The constru
vary according to requirements. The materials used are always of th
quality for the purpose. All filling is the toughest soft steel, specially rolle
the bracing is of the heaviest sort.

COMBINATION OR SLIP CROSSING,

such as required in making thoroughfare cross-overs over parallel track
with the most convenient and durable arrangements for operating t
Switches, easily placed, and satisfactory. Our experience in this line is ex

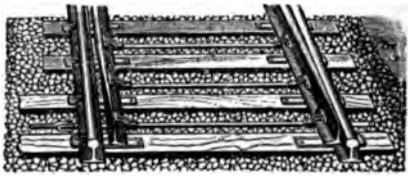
PATENT THREE-THROW SPLIT SWITC
operated wholly by one-hand Lever. Wherever it is excusable to reta
throw Switches this improvement should be used. It is justly regard
most satisfactory three-throw arrangement on the market, and is sold
erate price.

For particulars of above, address } **GEO. W. PARSONS, Supt. F. S. & S.**
STEELTON, PA.

PENNSYLVANIA STEEL CO.,

STEELTON, PENN'A.

SPLIT SWITCHES,
—AND—
LORENZ SAFETY-:-SWITCHES,



All made with **INTERCHANGEABLE PARTS**, unsurpassed in workmanship and fitting. Having unequalled facilities for their production, either for quantities or qualities, invite attention thereto. Have six different (standard) patterns of construction, suited to all requirements, and make several other patterns (on specifications). Imitations of our patented special patterns are extant, of which the public are warned. Slide plates or friction plates are Steel, and Braces of wrought steel; both, combined, make the ideal switch plate. Switch points fitted as required, and elevated as in Clarke-Jeffery Switch when required.

FIXTURES, OF ALL KINDS, FOR STUB SWITCHES.

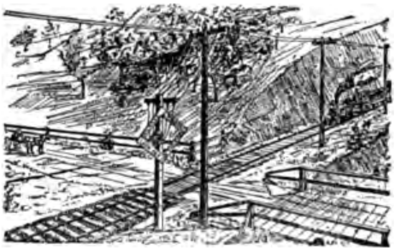
IMPROVED PATTERNS OF SWITCH STANDS,

of many different patterns, adapted to all requirements of switching. Some of them are "Standards" on many railroads, and some with new features conducive of safety.

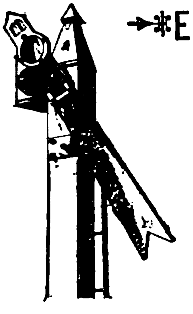
WROUGHT STEEL GUARD RAIL BRACES.

MAGNETO-ELECTRIC ALARM SIGNALS,

FOR HIGHWAY CROSSINGS.



THIS IMPROVED SIGNAL has great advantages over anything which has ever been offered for similar purposes. The safety of the public is secured by an ample warning in advance of the approach of the train, AT ALL HOURS, for only a fraction of the annual expense of *day* watchmen. It will be found to meet the requirements of the public at most of the dangerous crossings. Easily managed by ordinary people. Has the approval of authorities in several States.



ELECTRIC SEMAPHORE SIGNALS,

Operate at any required distance with certainty and precision. Useful at all points where trains are to be signalled and controlled from a distance. Movement of signal effected by currents from magneto machines, which will operate any required number of Semaphores from the one station.

The same Semaphores are used in a system of

AUTOMATIC BLOCK SIGNALS

of the lowest cost and most perfect operation. Now in operation on several roads.

For particulars address } **GEO. W. PARSONS, Supt. F. S. & S. Dep't.,**
STEELTON, PA.

JAY C. MORSE, President. ROBERT FORSYTH, Manager.
H. A. GRAY, Secretary and Treasurer.

THE

UNION STEEL CO.

OF

CHICAGO, ILL.

BESSEMER + STEEL + RAILS

OFFICE: | WORKS:
302 First National Bank Building. | Ashland Avenue and 31st Stre

THE WEIR FROG CO.

Manufacturers of the Most Complete Line of

TRACK+SUPPLIES,

and have the largest capacity of any similar concern West of the Alleghany Mountains.

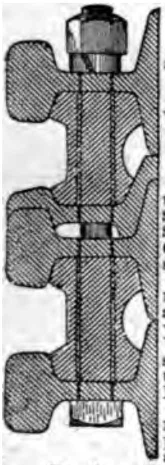
WORKS: Front, Smith and Water Streets,

CINCINNATI, O.

In the list of their manufactures may be mentioned Six Styles of Rigid Frogs, Two Styles of Spring Frogs, the well-known Clarke-Jeffery Split Switch with F. C. Weir's Improvements, Crossings, &c., illustrations of a few of which are shown herewith.

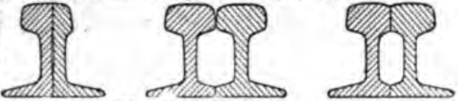
First, we desire to call the attention of the Roadmasters to our Rigid Frog, which is shown in cut, and Cross Section, cuts 1 and 2, Cross Section of which shows our Specially Rolled Solid Steel, or Wrought Iron Filling process. These Frogs are secured with ⅞ Through Bolts, the Widest National Lock Washer Company's Nut Locks, and Hex Nuts, making a very strong and durable job.

There having been some discussion as to the merits of the different methods of constructing points of frogs, we have concluded to show them all up, believing there will be but one conclusion by the level-headed, practical trackmen.



No. 2.

No. 1.



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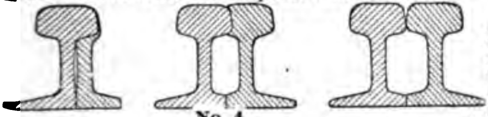

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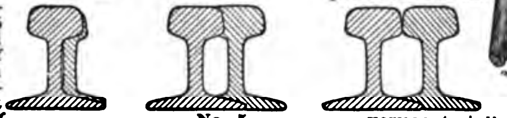

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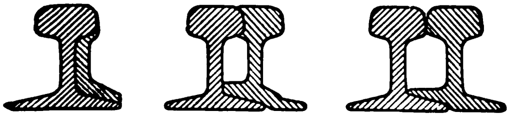
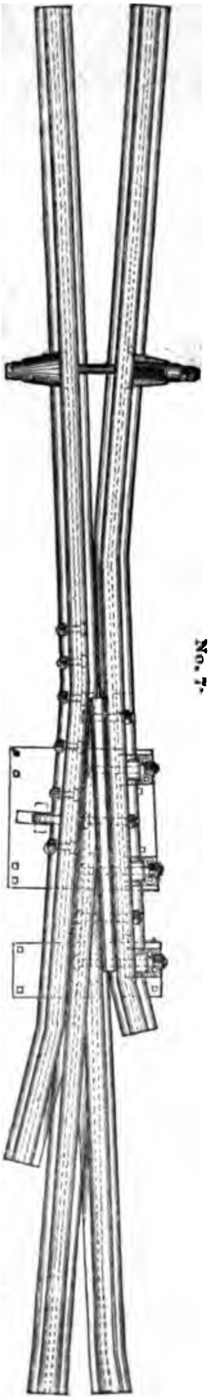


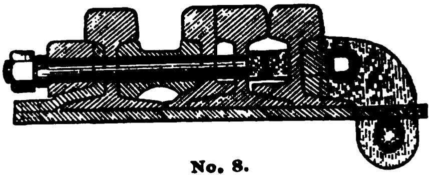
No. 6.

Cut Cross Section No. 3 shows original method of maki'g points of frogs by notching the main point rail to receive short point rail. Cut No. 4 shows the first improvement on this, by which the head of the main point rail was preserved but the base weakened. Cut No. 5 shows the full strength of the main point rail preserved, but at the cost of very materially weakening the short point rail, so that it has a very slim vertical support. Cut No. 6 shows the latest improvement, which is the WEIR system, manufactured and controlled exclusively by us. This is what we term our Die Formed Short Point. By this method we not only save the full strength of the main point rail, but more of the original strength of the short point rail, and produce a stronger construction of the point rails generally.

These cross section cuts are fair illustrations photographed down from full-sized drawings, therefore they can be unhesitatingly accepted as correct.



No. 7.

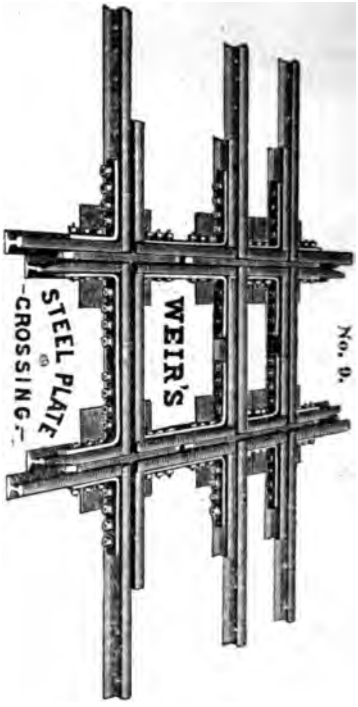


No. 8.

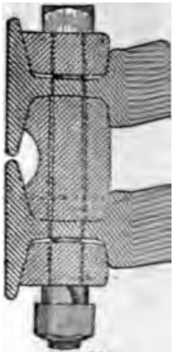
Cuts Nos. 7 and 8 show plan and cross section of Spring Frogs, which are on ½-inch Steel Plates, the same being secured to the Frog by Wrought Iron Angles or Clips on the Bolts passing through the Webs of the Rails, and thereby saving injury to the Wing and Point Rails by riveting through their flanges. The Combined Holding-down and Spring-Wing protection device, it will be observed, in Plan and Cross Section is formed of one piece, of best Wrought Iron, fitted to the shape of the Rail, made extra heavy, with a strong arm forged to it, which passes down through the Steel Bed Plate. Through the bottom of this arm is secured a Friction Roller to reduce the friction of the moving of the Spring Wing Rail.

This heavy Protection Bar, it will be observed, is secured to the web of the Rail with three ¾-inch bolts either way from the extreme point of the Frog, and this insures the holding together of the Rail in the event of its being broken, and thereby avoiding an accident.

For the above reasons we believe this to be the most efficient and durable Spring Frog in the market.

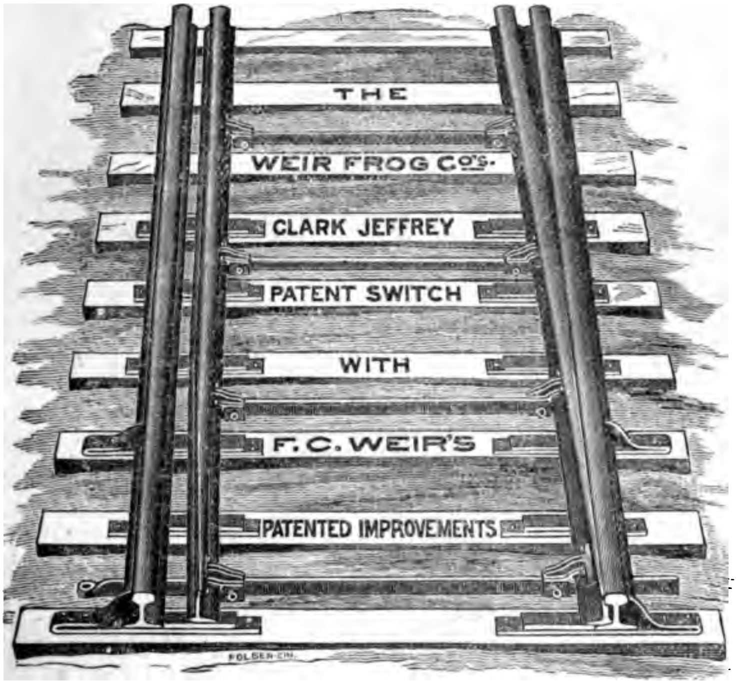


No. 9.



No. 10.

Our Crossings, made with Specially Rolled Sc[illegible] Wrought Iron or Steel Filling, as shown by cut N[illegible] and Cross Section No. 10, are very extensively u[illegible] These Crossings are secured with Specially Rolled v[illegible] heavy Wrought Iron Bars, which, with the use of eig[illegible] or more through Bolts, ⅞-in. in diameter, Hex Nuts, [illegible]he Widest National Lock Washer Company's Nut Lock, produce the strongest and most durable structure possible; and being supported on Steel Plates at each corner, the durability of not only the Crossing, but also the Ties is assured, without impairing the elasticity.

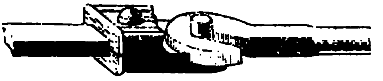


No. 11.

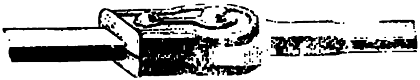
Our improved Clarke-Jeffery Patent Split Switch, as shown by cut No. 11, **possesses many valuable** and superior features. The method of Joining the Tie Bars **is a late improvement, and is** highly commended by some of the most **experienced railway officials.** Our Wrought Iron Combined Brace and Friction Plates **used with these have** no equal, as they are Indestructible, and we alone have the **right to furnish them.** All of the Friction Plates of this Switch are Wrought **Iron, and all of them** pass through under both Main Track and Split Point Rails, **so that an** equal Bearing is always insured on both the Main Track Rail and **Friction Plates.**

Our capacity for furnishing these Switches is practically unlimited.

Our High Switch Stand, shown on cut No. 12, is what we term our **Union Pacific Pattern;** possesses the merit of not permitting tampering with the Connecting **Rod when** it is once put on in its place and the Crank Shaft bolted up, as the **Bottom Plate** under the **Stand** prevents removal. The **Locking** device in the **Lever Casting** at the Top of the Stand is very simple and very effective, as will **be seen** by the cut. We make this pattern that we term High Stand, and also a **Pony Stand,** which is not more than half its height, with any style of Target as **desired.** To complete this Switch Stand and Connection we have devised a **Locking device for** the Switch end of **the Switch Stand,** Connecting Rod. **This special arrang**ement is shown by **cut No. 13, with the** Top Plate taken off, **showing the Hook** arrangement, and **also** by cut No. 11, showing the device **complete.** To attach this Connecting Rod it is necessary to swing it round **nearly** into line with the Main Track, then Hook it on to the Pin and swing it **back at right-an**gle with the **Track, and put** the Switch Stand **Crank end on to** Crank of Switch **Stand, after** which there will **be no possibility** of anyone mo**lesting it.** We think this very **simple arrangement** will be appreciated by those who have had trouble with **having** their Switches moved and the Target allowed to stand in position to de**ceive Engineers.** We *have also another* Switch Stand, that we term our Auto-



No. 13.



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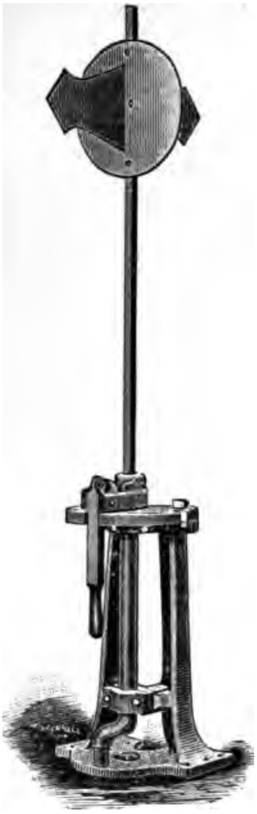
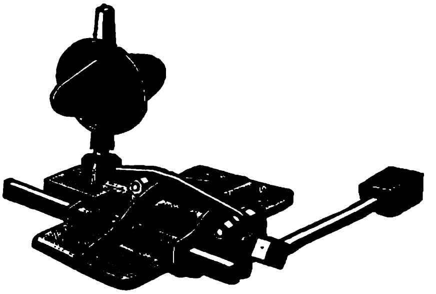


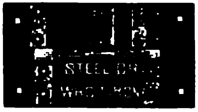
No. 12.



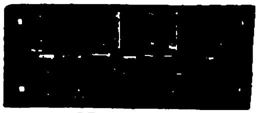
No. 15.

matic Low Target. This is shown by cut No. 15. It is very positive in its motion, and a very durable Stand. It can be used with either Stub or Split Switch, but is automatic only with Split Switches, when trailing through them.

We have furnished large numbers of these with excellent satisfaction.

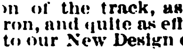


No. 16.



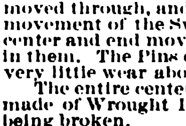
No. 17.

Cuts Nos. 16 and 17 illustrate our Open Hearth Steel Plate Head Chairs. These are so well known that it is hardly necessary to make any remarks as to their merits, but it may not be generally understood that because of using Steel Plates we are enabled to preserve the Elasticity of the Switch Joint and thereby prolong the life of the Switch Rails, as well as furnish a Head Chair that will outlast any other in the market. We are furnishing these in Carloads, which alone is sufficient as to their merits.



No. 18

Is the Wrought Iron Rail Brace made by this Company, and gotten up to supersede the old style of Cast Iron ones that are usually chunks, yet are easily broken in spiking and from other causes. These are indestructible, either in spiking or any other way, and as they only weigh 7 pounds, where the old style weighed from 15 to 25 pounds, they are fast doing what they are designed for—running the Cast Iron out. Several of the leading lines are now ordering them by the thousands.



No. 19.

We have recently designed and patented an improvement on the above Brace, which is shown by cut No. 19. This Brace will be made of Steel. It is gotten up specially for Bridges, to insure having a light, strong Brace. There is no objection, however, to using it for any bracing purpose for any portion of the track, as it is equally as durable as Wrought Iron, and quite as efficient.

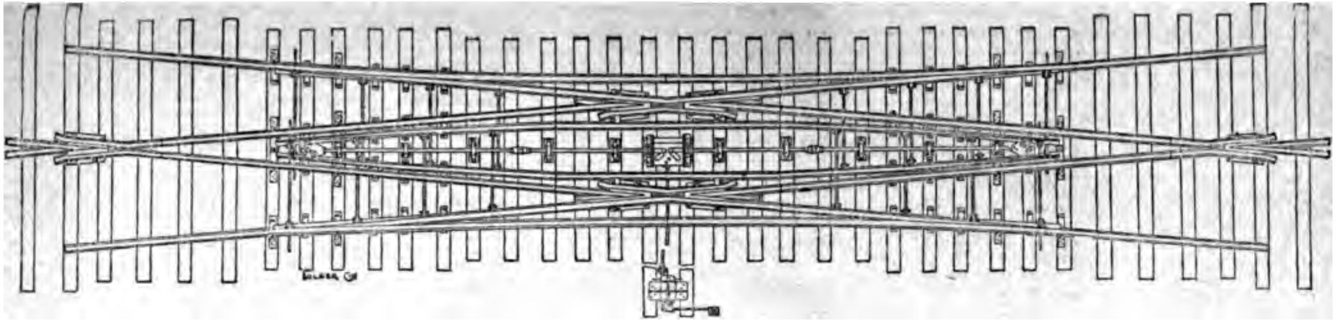
Special attention is called to our New Design of Combination Cross-over, or Slip Switch, No. 20. We term it the Frictionless Combination Crossing, or Slip Switch. It is so designated because the Longitudinal Center Throwing Rod, or Shaft, as well as the Throwing Plates at either end and in the center, are all moved through, and by, Friction Rollers, and by this means we accomplish the movement of the Switches much easier than has ever been done before. The center and end moving Plates are Steel, as well as the Friction Rollers that move in them. The Pins on which the Rollers move are also Steel, so that there can be very little wear about these parts.

The entire center structure for moving these longitudinal Rods, or Shafts, is made of Wrought Iron, or Steel, so that there is no danger of any of the parts being broken.

We are the first to place this longitudinal moving Rod, or Shaft, in the center of the device, between the tracks, and thus relieve the yards and tracks of such obstructions. The movement of this device is Positive, Accurate and Easy, and is, as shown, worked with one Stand, either High or Low.

These are made either angles 09 deg. 32 min., 08 deg. 12 min., or 07 deg. 10 min.

They are admitted to be the most perfect device of the kind that has been put on the market.



No. 20.

In making orders for Frogs, Switches, Crossings, or Head Chairs, the Section of Rail should be furnished, giving Height and Weight, Distance of Fish Plate Holes, Gauge of Track, and Angles of Frogs or Crossings. Blue Prints are requested for any or all of this work whenever they can be furnished.

Promptness is guaranteed in filling all orders, as well as good workmanship.

Estimates, also Lithographs and Photographs, furnished on application.

Address

THE WEIR FROG COMPANY,

Front, Smith and Water Sts., CINCINNATI, O.

Ajax Forge Company

CHICAGO, ILL.

STEEL RAIL BRACES,

To Fit any Section of Rail.

FROGS, SWITCHES & CROSSINGS,

OF EVERY DESCRIPTION, AND OF THE

MOST APPROVED PATTERNS.

SWITCHSTANDS AND FIXTURES.

STEEL FOOT GUARDS.

IRON OR STEEL HEAD CHAIRS.

Proceedings

—OF THE—

SEVENTH ANNUAL CONVENTION

—OF THE—

Roadmasters' Association

—OF—

AMERICA,

—HELD AT THE—

Chamber of Commerce, Denver, Col.,

SEPTEMBER 10, 11 and 12, 1889.

EDITED BY THE SECRETARY.

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1889.

FROGS
AND
CROSSINGS

Of Various Improved Patterns, or to Specifications, as Or

The special improvements in Frogs introduced and made solely by th
pany, are used and approved as standards on many of the most lea
Railroads all over the country, and give always the best possible servic

SPLIT SWITCH
and LORENZ
SAFETY SWITC

OF IMPROVED PATTERN

Controlled by this company and extensively used; also of special pat
accordance with specifications furnished by roads.

SWITCH STANDS OF IMPROVED PATTE

STUB SWITCH FIXTURES, TIE-BARS, Etc.,

MAGNETO ALARM SIGNALS FOR HIGHWAY CROSSIN

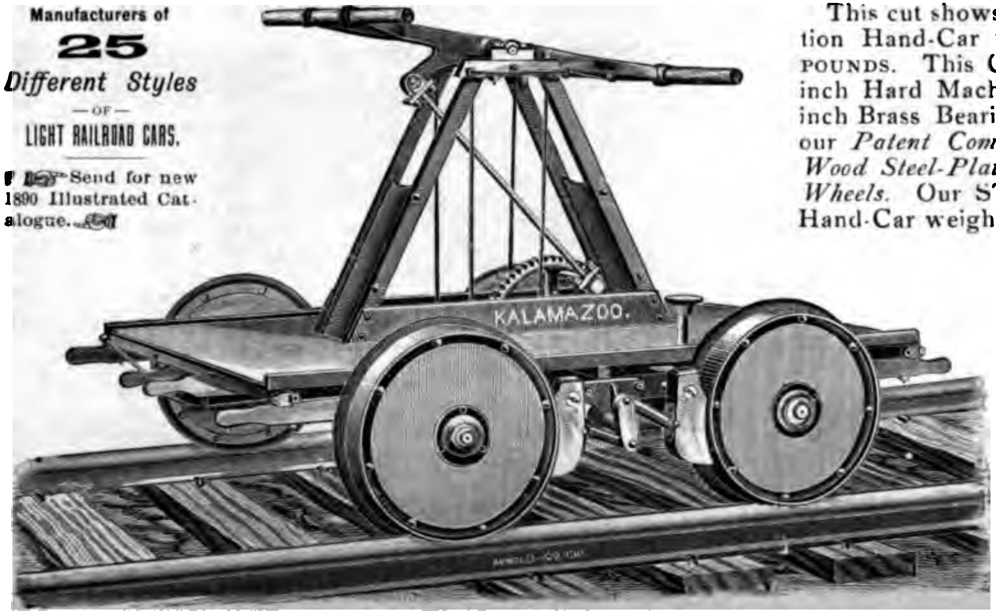
Efficient and Acceptable Crossing Protection.

Safety of the public secured at all hours, for only a fraction of the expens
watchmen. Electricity is generated by Magneto apparatus which is [illegible]
and reliable, acting only by passage of trains or locomotives, and which
is required. Easily managed and requires no attention [illegible]

SEMAPHORE SIGNALS OPERATED AT ANY DISTANCE

KALAMAZOO R. R. VELOCIPEDE AND CAR COMPANY,

Kalamazoo, Mich.,



Manufacturers of

25

Different Styles

—OF—

LIGHT RAILROAD CARS.

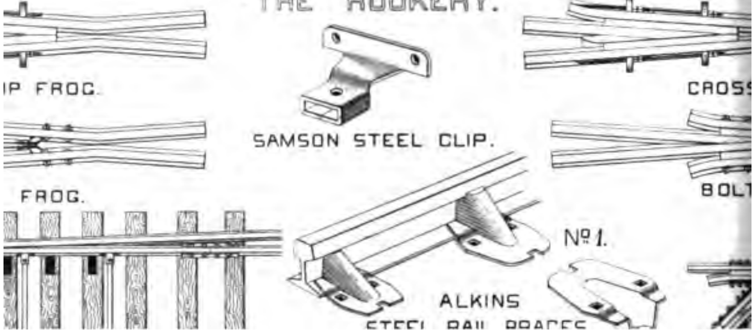
Send for new 1890 Illustrated Catalogue.

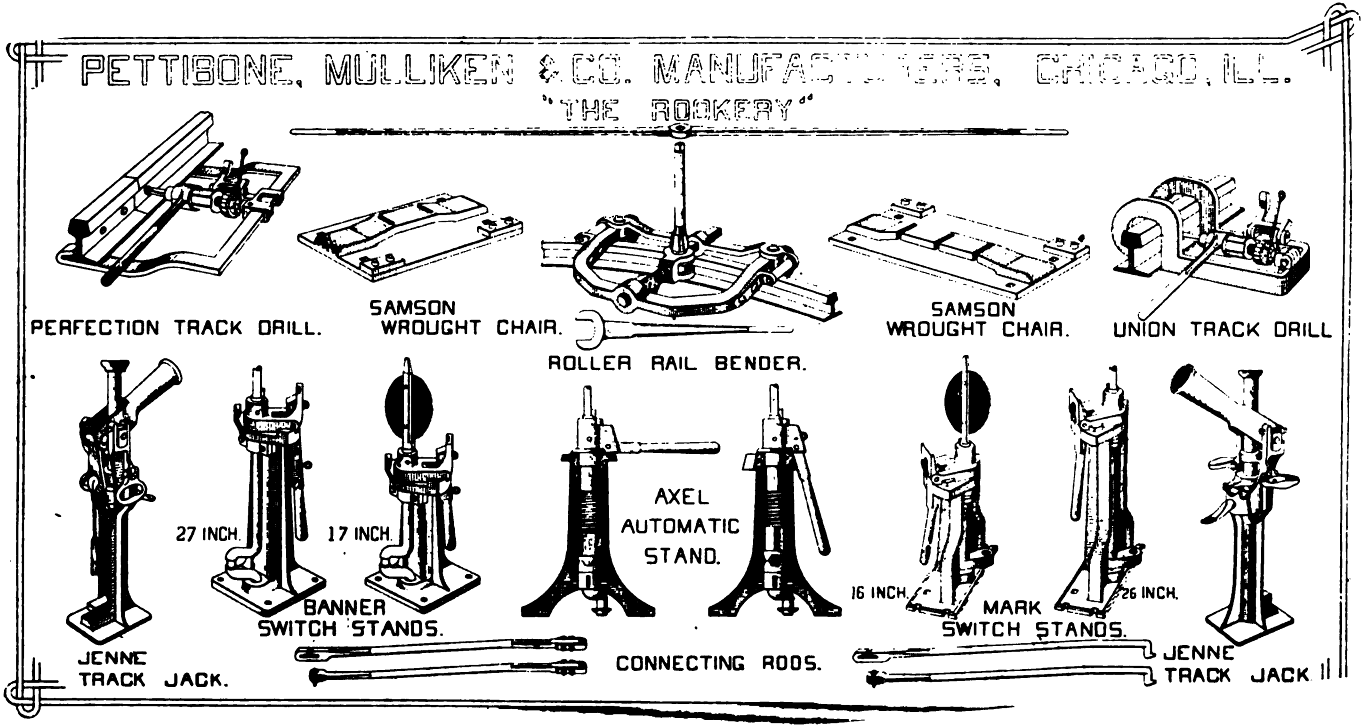
This cut shows our new light Section Hand-Car WEIGHING ONLY 475 POUNDS. This Car is fitted with 1½-inch Hard Machinery Steel Axles, 3-inch Brass Bearings. Side Brake. and our *Patent Combination Paper and Wood Steel-Plated and Steel-Tired Wheels.* Our STANDARD Section Hand-Car weighs 550 pounds. Over Twenty-five Thousand (25,000) of our Combination Wheels are now in use, and many have been in service for over three years, and are still apparently as good as new. These **wheels have been pronounced by practical railroad men, the most serviceable and durable light wheel in the market.**

Send for Special Illustrated Descriptive Circular of our latest improved Steam Inspection Car, fitted with 3½-horse-power boiler and engine.

We sell our Goods on their Merits, and will send Sample Cars on 30 or 60 Days' Trial to Railroad Companies.

MULLIKEN & CO. MANUFACTURERS, C
"THE ROOKERY."





PETTIBONE, MULLIKEN & CO. MANUFACTURERS, CHICAGO, ILL.
"THE ROOKERY"
PERFECTION TRACK DRILL.
SAMSON WROUGHT CHAIR.
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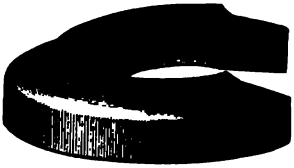
SAMSON WROUGHT CHAIR.
UNION TRACK DRILL
JENNE TRACK JACK.
27 INCH.
17 INCH.
BANNER SWITCH STANDS.
AXEL AUTOMATIC STAND.
16 INCH.
26 INCH.
MARK SWITCH STANDS.
JENNE TRACK JACK
CONNECTING RODS.

* THE *
NATIONAL
LOCK WASHER.



SIMPLE, EASILY APPLIED.

Combining Strongest Spring Fastening possible, with positive locking of Nut by **rib.**

Can be used on any make of bolt or nut, in any place in track.

Same bolt, nut and washer can be used as **often as required.**

The National Lock Washer is made of steel, hardened and tempered in oil; when in use in track the rib is imbedded in nut (does not cut out metal in nut), thereby upsetting metal of nut and forcing it around bolt, and so locking nut that it cannot jar loose, acting at same time it has all the spring-holding power of the best spring nut lock made.

A trial of the **National Lock Washer** is requested, as actual use will demonstrate its superiority.

Samples furnished free of expense.

THE NATIONAL LOCK WASHER CO.,
93 Mechanic Street,
NEWARK, N. J.

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1890.

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OFFICIAL STENOGRAPHER

INDEX TO SUBJECTS.

PAGE.

ADDRESS—Of Welcome, by Wolf Londoner.................. 10
  Response, by Mr. J. W. Craig.......................... 11
  Of J. H. Preston...................................... 107

ROLL-CALL.. 13–23

COMMUNICATIONS.............................24, 25, 26, 27 & 112

UNFINISHED BUSINESS.................................... 27

REPORTS—Standard Track Joints......................... 30 & 92
  Labor on Track.. 56
  Automatic Switch Stands and Protection of Switch Points.. 61
  Standard Frogs.. 87
  Cattle Guards and Road Crossings...................... 101
  Track Tools and Implements............................ 119
  On Resolutions of Thanks.............................. 118
  On Resolutions of Sorrow.............................. 123

LIST OF VISITING LADIES................................ 122

ELECTION OF OFFICERS................................... 124

SELECTION OF PLACE OF NEXT MEETING..................... 131

NEXT ANNUAL CONVENTION,

DETROIT, MICH.,

Second Tuesday in September, 1890.

INDEX TO ADVERTISEMENTS.

Switches, Frogs, Crossings, Etc.	Page.
The Weir Frog Co.	157, 158, 159, 160 and 3d page of cover
Pennsylvania Steel Co.	2d page of cover and 138, 139
Elliot Frog & Switch Co.	152, 153, 154, 155
Ramapo Iron Works	137
Ajax Forge Co	4th page of cover
Pettibone, Mulliken & Co	2
Sheffield Velocipede Car Co	149
G. R. Campbell	150, 151
Rail Joints, Nut Locks, Etc.	
Dunham Manufacturing Co., colored insert between pp. 132 and	133
Bush Interlocking Bolt Co	148
Ruffner & Dunn	143
National Lock Washer Co	4
Verona Nut Lock Metcalf, Paul & Co., ½ page	156
Morris Sellers & Co	141
Hand Cars, Tools and Implements.	
Rotary Snow Shovel Leslie Brothers Manufacturing Co	144, 145
Sheffield Velocipede Car Co	149
Kalamazoo Railroad Velocipede and Car Co	1
Buda Foundry and Manufacturing Co	142
Joyce, Cridland & Co	146
Ramapo Iron Works	137
Pettibone, Mulliken & Co	3
F. C. Austin Manufacturing Co	140
G. R. Campbell	150, 151
Steel Rails.	
Pennsylvania Steel Co	2d page of cover
Railway Signals.	
Pennsylvania Steel Co	138, 139
Ramapo Iron Works	137
Surface Guards.	
National Surface Guard Co	147
Bureau of Inspection, Tests and Consultation.	
The Robert W. Hunt Co., ½ page	156

Proceedings of the Seventh Annual Convention

OF THE

oadmasters' Association of America,

HELD AT THE

CHAMBER OF COMMERCE, DENVER, COL.,

September 10th, 11th and 12th, 1889.

The Roadmasters' Association of America assembled at
A. M., September 10th, 1889, at the Chamber of Commerce,
enver, Col., in response to the following call:

ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE SECRETARY,
WAYCROSS, Ga., June 5, 1889.

n accordance with the action of the meeting of the Roadmasters, held
Washington, D. C., September 11th, 12th and 13th, 1888, the Seventh
nual Meeting of the Association will be convened at Denver, Col., for
ee days' session, at 9 o'clock A. M., Tuesday, Wednesday and Thurs-
y, September 10th, 11th and 12th, 1889.

he committee appointed to prepare a programme of questions for
cussion at this meeting have submitted the following:

st. Standard Track Joints R. Caffrey, Chairman.
d. Standard Frogs P. Nolan, Chairman.
d. Labor on Track O. F. Jordan, Chairman.
th. Automatic Switch Stands and Protection of Facing Points -
bert Black, Chairman.
th. Track Tools and Implements S. L. Swinney, Chairman.
th. Standard Cattle Guards J. Doyle, Chairman.

EAR SIR You are respectfully invited to be present at this, the Sev-
h Annual Meeting of the Association. Arrangements are now in
gress whereby we hope to arrange with the railway managements to
s all delegates (and their wives) holding certificates issued by the As-

cates.

Delegates' certificates will only be sent upon application to th
tary.

J. W. CRAIG, H. W. REED,
President, *Sec'y & Tr*
Charleston, S. C. Waycro

The President, Mr. J. W. Craig, of the C. & S. R. R.
the Convention to order, as follows:

Gentlemen of the Roadmasters' Association of America
Association adjourned at Washington, D. C., last aut
assemble at Denver, Col., the 10th of September, and
now assembled ready for business, and I am very mu
ified to see so many of you present.

After a little waiting, Mr. Wolf Londoner, Mayor
city of Denver, appeared and made the following ad
welcome:

The President—*Ladies and Gentlemen:* I have the
ure of introducing to you the Mayor of the city of I

Mr. Londoner—*Mr. President, Ladies and Gentleme*
behalf of the good people of Denver, allow me to ex
you the right hand of fellowship. Strange as it ma
we, of Denver, are indebted to you for a part of ou
ness. The casual public who travel on the great hi
of our nation, travel in Pullman cars and in chair c

nd elegance of travel now between the Mississippi and
Mountain country. I say again to you, Roadmasters,
enting all parts of the country and this great nation,
e city and people of Denver, and of the great Rocky
, the State of Colorado, we extend to you a hearty
ne, and hope that while you are with us that you may
ly enjoy the hospitality of the good people of Den-
t extend your visits within this great State. And,
we will hang out our latch-strings and ask you to visit
t only on this occasion, but whenever possible. Visit
hools and churches—and I think men of your business
l visit a church once in a while, especially when you
ay from home, as you know not what may happen on
il.

w me, on behalf of the city, to extend you a cordial
ion to visit the City Hall. We have an excellent Fire
tment, and on fifteen minutes' notice, I will assure
e will give you a show that will please you. Visit our
buildings, if possible, and carry back to your friends
ll-known fact that Denver has the best in the United
. Please excuse me now, as I have another conven-
attend and address. You will find us ready and anx-
have you learn what a large city we have, and how
ble is our real estate industry.

Mayor retired in haste.

President—*Members of the Roadmasters' Association and
dies present:* I regret that the engagements of the
were such that he could not remain longer, so that
t respond to his address.

ne would have dared claim for Denver, a quarter of
ry ago, the proud position that it holds at this time.
it was a mere village, without wealth, without influ-
emote and unsightly. Now it is a metropolis—a cen-
refinement, a place rich in itself, and the admiration
beholders. More than keeping pace with the phe-
al growth of a region that is still in its infancy, so far
elopment is concerned, it has lost no opportunity and
ted no chance. Active, keenly alive, progressive and

vigorous, it has turned to its own account the fortunes of the State of which it is the capital, and has secured by every means in its power the reputation it to-day enjoys, "The Queen City of the Plains."

When the history of the far West is written, and the causes of that growth and development, which we now applaud, are analyzed, it will be seen that Denver has often been the power behind the throne.

Her capital and her people have protected new ventures, and kept alive the confidence in the future of the State. Through financial disaster, through all vicissitudes, there can be found no diminution of the faith that at last has been rewarded by the growth of a great city in close proximity to the region that, as long ago as 1806, tempted the valiant Pike to cross the unknown plains lying beyond the muddy waters of the Missouri.

Like a romance is the story of Colorado's growth, and not less so is that of the growth of Denver. We miss finding in its history the fanciful doings of Spanish adventurers and pious Padre. No fierce wars were ever waged for its possession; no glittering pageants were ever held in the long, wide streets, with their vista of mountains and plains. There was little that was poetical, but much that was practical. Still, the story is as interesting as though there had been these well-worn episodes to draw upon and to magnify and render picturesque.

For the tale is how man came to a wilderness and lived down all trials and all disappointments; how he fought against great odds and battled with hardships, and came out victorious. And if we are not satisfied with the practical realities presented, and still desire some glitter of gold to lighten the narrative, we have but to turn to the mountains. In their wild fascination will be found the foundation of all the romance we wish.

Mr. Chamberlain, the President of the Board of Trade, is indisposed and not able to be present. He was to have met us and given us a welcome address. Not being well, accounts for his absence.

have closed the preliminary proceedings, and as the s of the Association from now on will be simply rourk, it might be tiresome for the ladies to stay and Therefore, I would suggest that they retire, as they ish to visit the different parts of the city. This is mentioned to give them an opportunity.

next thing in order will be the reading of the minutes last meeting. This has been printed and distributed nembers of the Association, and if there are no objece minutes will stand confirmed.

bjection was made, and the minutes of the last meetod approved.

roll was then called by Mr. H. W. Reed, F. S. & W., ows—the † indicating those who answered to their :

ist of Members up to and Including the Convention of 1888.

A. B	W. St. L. & P	LaFayette, Ind.
T	B. & O	Connellsville, Pa.
T	C. M. & St. P	Austin, Minn.
er, John T	Ga. Pac	Atlanta, Ga.
G. M	S., F. & W. R'y	Waycross, Ga.
, L. E	C. B. & K. C. R'y	Moulton, Ia.
. E	A., T. & St. F	Trinidad, Col.
R	I. B. & W	Mount Carmell, Ill.
Z. W	Fall Brook Coal Co	Wellsboro, Penn.
saac	W., St. L. & P	Cowles, Neb.
P. W	L. & H. R. R. R	Warwick, N. Y.
ohn	Bishopville	Atkins, S. C.
Daniel	K. C., St. J. & C. B	St. Joseph, Mo.
V. G	D. & S. F. R'y	Pueblo, Col.
H. W	C. & N. W. R. R	Tracy, Minn.
R. W	S. P. Coast R. R	Alameda, Cal.
, W. R	M. & C. R. R	Tuscumbia, Ala.
J. A	S. Carolina	Summerville, S. C.
George	C., M. & St. P. R'y	Horicon, Wis.
H. H	B. R. R	Towanda, Pa.
, Thomas	R. & D	Columbia, S. C.
Robert	M. E	New York, 71 Broadway.
A. L	L. S. & M. S	Hillsdale, Mich.
S. T	C. C. & A	Batesburg, S. C.
J. R	T. C. & St. L. R'y	Marion, Ind.
uncan	C. P	Rat Portage, Ont.

Blue, A. P	Ga. Pac	Bi
Blue, C. F	K. C. M. & B	H
†Boardman, E. A	Union Pacific	Go
Bolan, James	D. B. C. & A. R. R	Ea
Bolan, Matt	Central Iowa Railway	Ac
Bond, B. F	O. & M	Fl
Bowen, J. H	M. P. R'y	Lo
Brandt, Wm	C. & N. W. R. R	Ma
Breckenridge, W. L	C. B. & Q	Ba
Brennan, J. C	St. P. M. & M	St.
Brennan, J. J	St. P. M. & M	Mi
Briggs, J. W	N. P. R. R	Ol
Brown, E	Union Pacific	Ra
Brown, Geo. M	Flint & Pere Marq	Ea
Brown, Robt	St. L. A. & T	Ma
†Brown, S. H	C. & N. W. R'y	Re
Brown, W. F		Ea
†Brunk, T. J	D. S. P. & P	De
Buel, H. A	C. M. & St. P. R'y	Re
Buhrer, C	C., Santa Fe & Cal	St
Burgwin, J. H. K	G. R. & I	Pe
Burke, J. T	S. & E. F. (So. Pac.)	W
Burke, P. D	Central Pacific	Mi
Burnett, C. M	Central Iowa	M
†Burnett, I	Insp. Eng. Ill. Steel Wks.	Jol
Burns, M. F	U. P. R. R	Bo
Bushnell, J. W	F. C. & P	Ja
Butler, John	I. C	Po
Byrne, Hugh	L. N. A. & C	Bl
†Caffrey, Richard	Lehigh Val. R'y	W
†Cain, Geo. E	W. St. L. & P. R'y	De
Campbell, G. R	O. C	Bu
Cantree, S. T	E. & W	Ca
Capwell, W. E	A. T. & S. F. R'y	Ni
Carle, J. D	B. C. R. & N. R'y	W
Carnahan, W. J	T. & P. R. R	W
Carnes, E. H	C. St. P. M. & C	St.
Carney, C	Ill. Central	Le
Cassin, Dennis	O. & M	No
Cottom, J	N. P	Ja
Collopy, J. H	N. Y. C. & St. L	Be
Conley, P. J	St. L. & A. T	Pi
Conners, J. S	Canadian Pac	Wi
Cornell, C. H	C. M. & St. P	Du
Cox, A	C. St. P. M. & Q	Le
Cox, Frank	C. R. I. & P	At

J. E	C. M. & St. P	Sanborn, Iowa.
hlin, W. J	C. M. & St. P. R'y	Mason City, Iowa.
rtney, W. H	L. S. & M. S	Erie, Penn.
g, J. W	C. & S	Charleston, S. C.
pen, J. H	C. M. & St. P	Sioux City, Iowa.
n, Thomas	Mo. Pac. R'y	Palestine, Tex.
ley, Wm	A. & P. R. R	Williams, Ariz.
nings, John	C. P	North Bay, Ont.
nings, Wm	L. N. O. & T	New Orleans, La.
r, C. H	C. B. & Q	Galesburg, Ill.
M. R	B. N. Y. & P	Buffalo, N. Y.
r, P. W	L. E. & W. R. R. R	Lima, Ohio.
y, E. C	S. C. F., S. & M	Springfield, Mo.
es, Colin A	L. & N	Paris, Tenn.
is, Garrett	B. C. R. & N	Riverside, Iowa.
urcy, John	R. & D	Charlottesville, Va.
ney, F. D	U. P	Cheyenne, Wy.
ne, M. W	A. C. Line	Rocky Mount, N. C.
son, J. A	B. N. & C. R. R. R	Rochester, N. Y.
kson, J. B	Penn. Co. C. & P. R'y	Wellsville, Ohio.
lle, A. J	I. D. & S	Indianapolis, Ind.
dle, W. G	C. & O. R	Kansas, Ill.
n, J.	L. V	South Bethlehem, Pa.
bins, P	D. & S. P. (U. P.)	Denver, Col.
son, John A	G. C. & N	Monroe, N. C.
ahoe, W. J	C. R. I. & P	Iowa City, Iowa.
ovan, J	Canada Pacific	Winnipeg, Manitoba.
n, John P	C. & W. I	Chicago, Ill.
ey, E. J	L. V	Perth Amboy, N. J.
ey, J	U. P	Furgas Falls, Minn.
ning, G. W	N. P. R. R	Little Falls, Minn.
le, John	D. L. & N	Ionia, Mich.
y, E. G	C. M. & St. P. R. R	Marion, Iowa.
an, S. W.	C. M. & St. P	Marion, Iowa.
n, Wm.	B. & O. R'y	Newark, Ohio.
er, Thomas	M L. S. & W	Meyershaenser, Wis.
vards, E. P	C. & N. W. R. R	Sterling, Iowa.
tt, D	A. T. & S. F	LasVegas, N. Mex.
s, W. F	N. Y. P. & B	Woonsocket, R. I.
y, W	C. M. & St. P. R'y	Perry, Iowa.
cson, L		Galvin, Ohio.
n, Wm	K. & P. R'y	Kingston, Ont.
s, J. C	Illinois Central	
ey, John	A. T. & S. F	Emporia, Kan.
J. D	N. P. R. R	Billings, Montana.
atrick, T	S. P R. R	Sierra Blanco, Texas.

Floriet, V. D	Mex. Nat	City of Mexico, Mex.
Flynn, Luke	C. & N. W. R. R	Eagle Grove, Iowa.
Foracre, W. W	Ga. Pac. R'y	Douglasville, Ga.
Forbes, James	A. & N. M. R'y	Lordsburg, New Mex.
†Freeland, A. N	A. C. Line	Sumter, S. C.
†Gaffney, John	Mo. Pac	Eldorado, Kan.
Gallagher, M	W. C. R. R	Ashland, Wis.
†Galarneau, F. X	C. L. & Mo	Lima, Ohio.
Galvin, J. T	O. C. R. R	Grant's Pass, Ore.
Gaunt, J. M	M. K. & T	Waco, Tex.
Gay, J	M. H. & O	Ishpeming, Mich.
†Geddes, J. K	B. Z. & C	Zanesville, Ohio.
Geone, D. E	T. P	Dallas, Tex.
†Gilchrist, J. B	U. P. R. R	Denver, Col.
Griffin, M. J	N. Y., W. S. & B	Detroit, Mich.
Gilhooley, M	L. & N. R. R	LaGrange, Ky.
Gillispie, A. J	R. & A	Richmond, Va.
Glenn, Pat	O. R. & N. R. R	The Dalles, Ore.
Gogarty, Pat	N. P. R. R	Billings, Montana.
Grace, Perry	C., M. & St. P	Waukesha, Wis.
†Gray, N. A	C. B. & Q	Villisca, Iowa.
Green, F. W	C. P	Brandon, Manitoba.
Gregory, W. H	C. M. & St. P	Monticello, Iowa.
Gregg, R. D	I. I. & I. R'y	Kankakee, Ill.
Grogan, John	Southern Pacific R'y	Houston, Tex.
Gross, G. W	C. & S	Ridgeland, S. C.
Hall, James M	L. & N	LaGrange, Ky.
Hamill, James	D. & R. G. W. R. R	Salt Lake, Utah.
Hammond, C. P	R. & D. R. R	Atlanta, Ga.
Hanley, M	Fargo Southern	Fargo, Dak.
†Hanover, H. D	Ohio & Miss	Aurora, Ind.
Happersett, H. E	Ore. & Cal	Portland, Ore.
Harley, A	A. T. & S. F	Emporia, Kan.
Harrison, G. W	C. S. & M	Marion, Ala.
†Hawkins, A. M	Norfolk Sou	Berkley, Va.
Hayward, Joseph	K. C., St. J. & C. B	St. Joseph, Mo.
Hedding, D. W	C., M. & St. P	Horicon, Wis.
Heister, W. A	N. Y., L. E. & W	Buffalo, N. Y.
Henderson, J. C	Atl. & Pac. R'y	Daggatt, Cal.
Hennesey, P. H	C. M. & St. P	Perry, Iowa.
Hickey, Thomas	C., R. I. & P. R. R	Genesee, Ill.
‡Hickey, Timothy	M. C. R. R	Jackson, Mich.
Hildebrant, J. D	A. T. & S. F	Chanut, Kan.
Hines, T	C. M. & St. P	Wells, Minn.
Hogan, John	N. P. R'y	Bozeman, Montana.
Hogan, M	C. B. & Q. R. R	Red Oak, Iowa.

hton, G. A	L. S. & M. S	Andover, Ohio.
hton, Geo. B	L. S. & M. S	Norwalk, Ohio.
hton, H. H	L. S. & M. S. R'y	Elyria, Ohio.
hton, R. A	Wabash	Defiance, Ohio.
e, F. E	C. M. & St. P	Chillicothe, Mo.
, P	B. C. R. & N	Esterville, Iowa.
es, L. C	U. P	Sterling, Col.
ison, H	B. N. Y. & P	Olean, N. Y.
. A. B	C. M. & St. P	Albert Lee, Minn.
d, R	C. & M	Keene, N. H.
on, J. M	J. S. E. Line	Havana, Ill.
s, P. H	C. & N W. Ry	Winona, Minn.
on, O	C. P	Manitou, Manitoba.
J. S	Fla. Sou. Ry	Rochelle, Fla.
s, C. E	C. B. & Q. Ry	Beardstown, Ill.
on, O. F	M. C. Ry	St. Thomas, Ont.
s, John	C. & A	Springfield, Ill.
, C. B	White Water Ry	Cambridge City, Ind.
r, L. L	Texas Pac. Ry	Big Springs, Texas.
t, J	C. P	Medicine Hat. Assiniboia, Can.
r, J. B	C. M. & St. P. Ry	Cologne, Minn.
r, M. D	St. P. & D. Ry	St. Paul, Minn.
r, P. J	C. I. St. L. & C	Kankakee, Ill.
in, J. A	C. & N. W. Ry	Madison, Wis.
J. J	C. & M. Ry	Cambridge, Ohio.
elan, J	C. M. & St. P. Ry	Mitchell, Dak.
y, J	C. M. & St. P. Ry	Oxford, Junc., Iowa.
y James	Southern Pacific	Shulenburg, Tex.
l, E. R	C. & N. W. Ry	Chicago, Ill.
, J. F	F. S. & W	Thomasville, Ga.
G. W	W. St. L. & P	Essex, Ill.
k, Chas	B. R. B. & L. Ry	Winthrop Junc., Mass.
W. F	C. R. I. & P	Keokuk, Iowa.
an, C. H	C. F. S. & C	Streator, Ill..
I	Tex. Pac. Ry	Baird, Tex.
, Geo. W	D. & R. G. Ry	Durango, Col.
ey, J. H	C. B. & Q. Ry	Galesburg, Ill.
e, George J	A. T. & S. F. Ry	Newton, Kan.
s, P. H	C. & N. W. Ry	Milwaukee, Wis.
l, D. H	Penna. Ry	Renovo, Penn.
n, James	N. P	Sprague, W. T.
h, Pat	I. B. & W	Urbana, Ill.
s, H	A. T. & S. F	Kiowa, Kan.
gan, T. J	T. St. L. & K. C. Ry	Charleston, Ill.
ony, D.	O. & M. Ry	Olney, Ill.

McBride, James	St. L. & C. S	Chesterfield, Ill
McCarthy, D	J. T. & K. W	Palatka, Fla.
McCarthy, J	St. L. & S. F	Springfield, Mo
McClintock, W. H	L. & N	Louisville, Ky.
McCormack, P	M. & C	Iuka, Miss.
McDonald, F	C. B. & Q	Savanna, Ill.
McDonald, J. H	C. & N. W	Escanaba, Mic
McDonough, M	Texas Pacific	Marshall, Tex.
†McEniry, Charles	B. C. R. & N. Ry	Sibley, Iowa.
†McEntaffer, D	W. & L. E	Norwalk, O.
McGarr, W. L	B. C	Lock Haven, P
McGee, D. A	S. F. & W	Savannah, Ga.
McGiven, J	N. P. Ry	Brainard, Min
McGovern, J	Grand Trunk	Brockville, On
McGowan, O	St. L. A. & T	Dallas, Tex.
†McGregor, A	U. P	Pueblo, Col.
McGurgan, F. H	Wabash Ry	Moberly, Mo.
†McInarna, M. J	N. Y. P. & O	Mansfield, O.
McInerny, M	Mo. Pac	Emporia, Kan.
McKeown, P. W	D. L. & W. Ry	Mt. Morris, N.
McLeod, A. L	St. I. M. & S	Little Rock, A
McMichael, Geo. C	W. I. & N	Marshalltown,
McMillan, John	C. M. & St. P. Ry	Minneapolis,
McMillan W. J	M. C. & Ft. D	Mason City,
McNarney, M	C. M. & St. P. Ry	Elgin, Ill.
McNulty, W. H	A. T. & S. F	Rincon, N. M.
†McQuiston, J. C	C. I. St. L. & C	Indianapolis, I
Meeds, F. W	A. & P	Albuquerque,

, H. C	N. Y. C. & N	High Bridge, N. Y.
, J. Willis	S. F. & W. Ry	Waycross, Ga.
n, J. F	N. P	Missoula, Montana.
, T. O	C. J. St. L. & C	Indianapolis, Ind.
E. H	G. B. W. & St. P	Plover, Wis.
hy, Edward	C. W. & M	Elkhart, Ind.
ne, R. D	C. S	Somerset, Ky.
n, T. J	C. M. & St. P	Wabash, Minn.
y, J	G. C. & S. F	Indianapolis, Ind.
vin, P. J	N. P	Superior, Wis.
J. L	M. St. P. & S. S. M	Minneapolis, Minn.
J. M	C. K. & N	Wichita, Kan.
, C. R	R. & D	Burlington, N. C.
an, W. D	A. T. & S. F	Spivey, Kan.
, C. L	O. P. Ry	Daggett, Cal.
mb, G. B	North Eastern	Florence, S. C.
s, E. M	C. R. I. & P	Joliet, Ill.
F. A	C. P	Sudbury, Ontario, Can.
, P	N. O. & T	Birmingham, Ala.
le, J	D. & R. G. Ry	Grand Junc., Col.
n, Joseph	Ill. Cent	Champaign, Ill.
G. W	L. I	Long Island City, N. Y.
y, D	K. & W	Centerville, Iowa.
, Dennis	Penn. & N. Y. C	Auburn, N. Y.
r, Martin	F. C. & P. R. Co	Waldo, Fla.
, C. J	C. P. Winnipeg	Winnipeg, Manitoba.
, R. J	A., T. & S. F	Newton, Kan.
, J. R	Con. River	Springfield, Mass.
, W. T	C., St. P., M. & O. Ry	St. Paul, Minn.
n, J. H	N. & M. Ry	Midway, Ky.
W. S	C., M. & St. P. Ry	Elgin, Ill.
J. A	R. & D	Charlottesville, Va.
Thomas H	L. E. & W. Ry	Bloomington, Ill.
, P	A., T. & S. F. Ry	Newton, Kan.
n, E. W	C. M. & St. P. Ry	Millbank, Dak.
m, M	C., R. I. & P	Joliet, Ill.
s, John	Ohio & Miss	Lebanon, Ill.
, H	C. & O	Hinton, W. Va.
ett, P	M., L. S. & W. Ry	Clintonville, Wis.
, A. H	C. R. R	Augusta, Ga.
, W. H	C., M. & St. P	Tama City, Iowa.
ce, G. H	L. S. & M. S	Cleveland, Ohio.
on, J. H	C., R. I. & P	DesMoines, Iowa.
ll, M	J. M. & I. Ry	Columbus, Ind.
, J. H	P. & N. Y. C	Towanda, Pa.
rty, Thomas	C. M. & St. P. Ry	Lanesboro, Minn.

+Ramsey, John P	C. H. & D	Connersville, Ind.
†Ratliff, W. R	S. F & W	Waycross, Ga.
Raynor, T. N	C. & G. T	Battle Creek, Mich.
Ready, M	Vandalia Line	Effingham, Ill.
+Reed, H. W	S. & F. W	Waycross, Ga.
Reeves, O	C. & N. W	Marietta, Wis.
Reilly, Phillip	P. & N. Y. C	Tunkhannock, Pa.
+Reilly, Wm	C. & A. Ry	Bloomington, Ill.
Repelye, John	U. P	Denver, Colo.
Reton, V. A	C. M. & St. P	Monroe, Wis.
Richards, O. D	L. S. & M. S	Andover, Ohio.
Roach, P. K	O. & M	Pana, Ill.
Robbins, W. L	E. & T. H	Algona, Iowa.
Roberts, John	I. B. & W. Ry	Columbus, Ohio.
Robinson, T. V	C. St. L. & P	Algona, Iowa.
Robinson, W. D	C. & N. W	Carroll, Iowa.
†Rockhold, J. C	A. T. & S. F	Arkansas City, Kan.
Rogers, James	L. N. A. & C	Louisville, Ky.
+Ross, Donald	D. G. H. & M	Pontiac, Mich.
Ross, John	F. & P. M. Ry	Evart, Mich.
Rowan, M	C. N. O. & T. P	Hattiesburg, Miss.
Rustine, Bryan	D. L. & N. Ry	Ionia, Mich.
Ryan, James	C. & E. I	Danville, Ill.
+Ryan, J. C	U. P	Denver, Colo.
Sagerdahl, Wm	C. & G. T	Valparaiso, Ind.
Salter, J. F	Miss. & Tenn	Sardis, Miss.
Sawyer, F. E	St. L., K. & N. W	Keokuk, Iowa.
Scanlin, Patrick	C. & N. W	Boone, Iowa.
Scofield, James	Northern Pacific	Livingston, Mont.
+Scofield, John	T. H. & I. Ry	Brazil, Ind.
+Scott, J. W	N. M. & M. V. Co	Cecilia, Ky.
Scott, S. G	G. R. & I. Ry	Kalamazoo, Mich.
Sharkey, P	K. C., St. J. & C. B. Ry	Council Bluffs, Iow:
Sharpe, W. W	S., F. & W	Waycross, Ga
Shattuck, C. D	C., M. & St. P	Faribault, Minn.
Shaw, G. R	O. R. & N. Co	Portland, Ore.
Shea, John F	R. W. & C	Carthage, N. Y.
†Shea, M	C. N. O. & T. P	Somerset, Ky.
Shearer, L. H	Lehigh Valley	Buffalo, N. Y.
+Shehan, D	C. I. Ry	Keithsburg, Ill.
+Shepard, C. F	B. & M	Ranenna, Neb.
+Shine, Daniel, jr	W. N. Y. & P. R. R	Olean, N. Y.
Shoemaker, J. P	C., M. & St. P. R. R	Sioux City, Iow
Sing, J. W	A. C. L	Lanes, S. C.
+Sloan, James	C. & E. I. Ry	Danville, Ill.
	O. I. & W. Ry	Indianapolis, I

, W. T	St. L., A. & T	Texarkana, Tex.
D	O. R. & N	Umatilla Junction, Ore.
J. C	C. K. & N	Herrington, Kan.
I. P	T., St. L. & K. C	Delphos, O.
Richard	Southern Pac	Houston, Tex.
A	C. B. & Q. Ry	Rock Island, Ill.
te, R	R. & D	Columbia, S. C.
use, R. J	Danbury & Norwalk	Danbury, Conn.
l, M. A	Central Iowa	Oskaloosa, Iowa.
, W. H	C. N. W	Oak Park, Ill.
. R	W. St. L. & P	Marshall, Mich.
J. L	P., D. & E. Ry	Grayville, Ill.
R	C., M. & St. P. Ry	Marion, Iowa.
J. H	A., T. & S. F	Great Bend, Kan.
t, W. L	D., Ft. W. & C	Pleasant Hill, O.
, W. B	G. R. & I. Ry	Grand Rapids, Mich.
ell, C. H	C., M. & St. P. Ry	Coon Rapids, Iowa.
John	L. S. & M. S	Cold Water, Mich.
, J	Illinois Central	Dubuque, Iowa.
, J. D	C. K. & N	Horton, Kan.
, M	So. Pac	Hambrook, Cal.
sett, W. B	Car. Cent	Maxton, N. C.
, J	Penna	Erie, Penn.
nd, A. M	C. & N. W. Ry	Escanaba, Mich.
E. F	S. C. Div. P. & N. Y. C	Auburn, N. Y.
, D	C. K. & N	Bellville, Kan.
, S. L	W. St. L. & P	Cuba, Ill.
C. B	A., T. & S. F	Pueblo, Col.
, J. L	G. H. & S. A. Ry	Houston, Tex.
on, W. A	C. & G. T	Blue Island, Ill.
, J. C	C. St. P. M. & O	Black R. Falls, Wis.
J	M. & N. W	Elma, Iowa.
J	C. H. & D	Lima, Ohio.
. E	Mo. Pac	Yates Center, Kan.
eo. B	C. M. & St. P	Tomah, Wis.
ll, James	S. C. R. R	Kingsville, S. C.
, John	U. P	Kansas City, Mo.
Nicholas	T. & P. M. Ry	Ludington, Mich.
r, J. C	Ft. W.; C. & L. Ry	Ft. Wayne, Ind.
, W. J	E. S. R. R	Eureka Springs, Ark.
	Can. Pac	Three Rivers, Que.
Thomas	Ohio & Miss. Ry	Mitchell, Ind.
m	Can. Pac	Three Rivers, Que.
Robert	M. & N. W	Portage LaPrairie, Man.
Carson	C. C. & A. Ry	Rock Hill, S. C.
. J	Duluth & I. R	Two Harbors, Minn.

Worley, Geo.	Hot Springs	Malvern, Ark.
Worthly, A. H.	K. C. St. J. & C. B. Ry.	St. Joseph, M
†Wright, D.	S. S. M. & A.	Gladston, Mic
Wright, George	A., T. & S. F. Ry.	Topeka, Kan.
†Wright, John W.	C. & N. W.	Baraboo, Wis
Wyatt, J. B.	B. & M. R. R.	Wymore, Ne
Wyman, M. P.	Northern Pac.	Forsyth, Mon

The following list of new members proposed fo
was then read the † indicating those who were p

R. M. A. OF AMERICA.

List of Members Joining the Association since the Convent
up to and including the Convention of 1889.

Ball, Austin	St. L. I. & Southern	Charleston, M
†Banksam, A.	B. & M.	McCook, Ne
†Bishop, Geo. W.	Fitchburg	Athol, Mass.
†Burroughs, B. M.	S. C. & P.	Tallahassee,
†Cafferty, T. S.	A. T. & S. F.	Topeka, Kas.
†Chiever, A. S.	Fitchburg	North Adams
†Choat, W. G.	Union Pacific	Denver, Col.
†Clark, F. C.	Housatonic	Falls Village,
†Clark, Wm. E.	Ver. Val. & Sullivan Co.	Charlestown,
Curry, John	C. M. & St. P.	Yankton, Da
†Daggett, Geo. E.	N. Y. N. H. & H.	Bridgeport, C

	D. & R. G	Gunnison, Col.
D	A. T. & S. F	Ottawa, Kan.
	L. N. O. & T. P	Memphis, Tenn.
Wm	Boston & Maine	Nashua, N. H.
	Cheshire	Keene, N. H.
	N. Y. N. H. & H	Hartford, Conn.
T	St. L. N. & W	Hannibal, Mo.
	D. & R. G	Salida, Col.
J	M. K. & T	Smithville, Tex.
	C. & W. M	Holland, Mich.
	C. R. R. & B. Co	Savannah, Ga.
	A. T. & S. F	Topeka, Kan.
R	C. M. & St. P	Sioux City, Iowa.
B	U. P	Buena Vista, Col.
	A. T. & S. F	Topeka, Kan.
	Cent. R. R. of N. J	Jersey City, N. J.
Chas	So. Pacific	Sierra Blanco, Tex.
M. D	K. C. W. & N. W	Kansas City, Kan.
	A. T. & S. F	Emporia, Kan.
N	Wichita & Western	Kingman, Kan.
	U. P	Ellis, Kan.
, J. W	Fitchburg	North Adams, Mass.
H	Ore. Pacific	Yaguina City, Ore.
	C. K. & N	Herington, Kan.
G	C. & F. C	Marcelina, Mo.
	B. C. R. & N	Iowa Falls, Iowa.
	Int. & Gt. N	Austin, Tex.
. W	C. B. & Q	Burlington, Iowa.
	B. & M	Wymore, Neb.
N	N. L. & N	Palmer, Miss.
J	T. E. & M	Oakdale, Mo.
M	C. & W. M	Grand Rapids, Mich.
	B. & O	Pittsburg, Pa.
V. R	A. & F	Culloden, Ga.
. B	C. B. & Q	Aurora, Ill.
	M. K. & T	Smithville, Tex.
r, J. N	Troy Union	Troy, N. Y.
	T. St. L. & K. C	Charleston, Ill.
H	So. Pacific	San Francisco, Cal.
	Buffalo Ck	Buffalo, N. Y.
. M	A. T. & S. F	Pueblo, Col.
	O. & M	Aurora, Ill.
n	St. Louis Br. Co	St. Louis, Mo.
	O. D. L. & W	Elmira, N. Y.

Mr. H. W. Reed then spoke concerning per
able to secure endorsers, after which the foll
were made:

Mr. John Sloan— A man might live in some
'borhood, where it might have been impossil
have secured the required endorsers.

The President—Yes, sir, that is true; but i
that he must be very much of a hermit when
at least two Roadmasters to endorse him.
within the province of any member of the
move to amend the Constitution and By-La
but it does not seem probable to me that a
so far away from others as not to find some
who know him.

The Secretary then read the list of applica

Mr. R. Black—I have here the names of
who have several miles of track, and it is a qu
they should come under the head of Roadm
visor.

The Secretary read the section in the By-L
the matter in question, and they were admitt
ship.

The President—The next business in orde
of communications. All members of the A
have received the printed proceedings of th
meeting, know the great trouble the Preside
curing transportation, the great obstacle in
the Interstate Commerce Law. Thinking pr
receive some information from the Interst
Commission, I wrote them on the subject, and
will read their reply to my letter bearing on

The Secretary read as follows:

INTERSTATE COMMERCE
WASHINGTON, June 1

Messrs. J. W. Craig, President, and H. W. Reed, Sec
urer Roadmasters' Association:

DEAR SIRS—Yours on the subject of Free Transport
bers of the Roadmasters' Association of America, dire
man of the Interstate Commerce Commission, has be

visions of the 22d Section of the Act to Regulate Commerce, on the bject of giving free carriage to their own officers and employes, or exanging passes or tickets with other railroad companies for their officers d employes, is as follows:

> "Nothing in this act shall be construed to prevent railroads from giving free carriage to their own officers and employes, *or to prevent the principal officers of* any railroad company or companies from exchanging passes or tickets with other railroad companies for their officers and employes; * * * * "

s you will observe, this provision of law does not "prevent" Railroad panies from giving free carriage to, or from exchanging passes ickets for, any or all of their officers and employes. Nor can it be the Companies have any difficulty in knowing who are their officers employes. The free carriage and exchanging of passes and tickets ft by the law with the Companies to grant or not. The law neither ents nor enjoins on them such carriage or exchange.

nceding the deserving character of your organization, and its memip, the Commission can exercise no discretion in behalf of either in matter, which the law leaves with Railroad Companies without, reng them to give free carriage, to exchange passes or tickets, and ut preventing or hindering them from doing so.

Respectfully yours,
W. R. MORRISON,
Commissioner.

he President—You will observe that it is dated June 15th, . I desired to ascertain from the Interstate Commerce mmission, so as to add their reply to my circular letter, he three hundred managing officers in the United States, n whom I communicated on the subject of transporta-. Their communications were such that I could not exin them, but I sent out this communication, and you have been advised as to what the circular letters were, giving st of the roads furnishing them. Some roads have been rticularly kind, among them the N. Y., L. E. & W., the icago & Atlantic, the C. B. & Q., and many others. ose mentioned above have been particularly kind to a cern portion of this Association, especially to the delegates t came through from the East; and as the lists were sent all members of the Association, you will know what has en done. Now, gentlemen, what is it your pleasure to do th this communication?

Mr. W. F. Ellis, N. Y. P. & B.—I move that all communications on this subject, that passed between the President and others, be made a part of our proceedings. Carried.

The President The matter of free transportation over the railroads did not carry with it any concession on the part of the Pullman Company, and I took that up with the Pullman people, and here is their reply, which the Secretary will read:

The Secretary—The correspondence is as follows:

THE ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE PRESIDENT,
CHARLESTON, S. C., Aug. 13th, 1889.

Geo. M. Brown, Esq., Gen'l Manager P. P. C. Co., Chicago, Ill.:

DEAR SIR—With this I hand you a certificate which, when filled in and signed by the President and Secretary of our Association, will show the name of the Roadmaster who will be a Delegate to the Seventh Annual Roadmasters' Convention, to be held in Denver, Colorado, September 10th, 1889, and the road upon which he is employed.

Will you kindly honor such certificate for Roadmaster and wife, when presented to your Division Superintendents for passes over your lines? An early reply will oblige,

Very truly yours,
J. W. CRAIG,
President R. M. A.

SUBJECT: EXTENDING COURTESIES TO DELEGATES TO ROADMASTERS' CONVENTION.

PULLMAN'S PALACE CAR COMPANY,
Assistant General Superintendent's Office.
CHICAGO, Aug. 24th, 1889.

J. W. Craig, Pres't Roadmasters' Association of America, Charleston, S. C.:

DEAR SIR—Your favor of the 13th inst., to Mr. Brown, relative to the Seventh Annual Convention of the Roadmasters' Association, which will be held at Denver on the 10th day of September, has been referred to me. In reply, I have to say that we will take pleasure in extending to the delegates to this Convention and their wives, the same courtesies that we have extended to them heretofore. The Pullman Palace Car Company will furnish delegates who pay fare going to the Convention, with passes returning; *delegates should take receipts for fares paid going*, and upon presentation of same together with their credentials, signed by the President of the Association, to *Superintendent Pullman Sleeping Car Company, at Denver, he will issue passes for the return trip.*

Yours truly,
E. A. JEWETT,
Ass't Gen'l Superintendent

THE ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF THE PRESIDENT,
CHARLESTON, S. C., August 27th, 1889.

E. A. Jewett, Esq., Ass't Gen'l Superintendent P. P. C. Co., Chicago, Ill.:

DEAR SIR—In acknowledging receipt of your letter, 24th inst., allow me, on behalf of the Roadmasters' Association of America, to hank you kindly for passing our delegates and their wives over your lines, upon the conditions as stated in your letter. Very truly yours,

J. W. CRAIG,
President R. M. A.

The President—The next question is unfinished business. The Secretary will inform us what it is.

The Secretary—The subject of hand-cars was reported on t the meeting at Washington, D. C. I will read the report, s follows:

o the Roadmasters' Association of America:

We, your committee, would respectfully refer this report to the Mas- r Car Builders, with the following suggestions: That the car shall eigh 550 pounds, and not to exceed 600 pounds, with a steel axle 1½ nches in diameter, with 1⅜ inches journal, with 4 foot wheel base and 4 inch wheel, the tread to be 3½ inches, and the body of the car to be 7 eet in length.

CHARLES MELVILLE,
WM. H. STEARNS,
C. H. CORNELL,
JAMES SLOAN,
G. E. CAIN,
Committee.

On motion of Mr. Isaac Burnett, the report of the Committee was accepted and the Committee discharged.

In the first place, I wrote to the Secretary of the Master Car Builders' Association, sending this report, and received no reply. Afterwards I wrote him, calling attention to the fact that I had sent the report, and had received no reply, and he answered saying that he had referred it to the proper committee, and when that committee decided whether or not they should accept the suggestion, he would advise me. Since that time I have received no advice from the Secretary or any other official of that Association.

The President—Therefore, by the statement the Secretary has just made, you will know what disposition was made of

the unfinished business. The next thing
reports of the committees, and if receive
the same. The first subject on the list i
Joints," Mr. Caffrey, Chairman.

Mr. Caffrey, Lehigh Valley—We will
in a few minutes.

The President—We will allow you son
some other matters which we are comp
now.

By a circular letter you all have been a
tesies extended to us by the Union Paci
it is absolutely necessary for the manage
many people they are to handle, and we
formation to-day. The only way to do
ber to answer to his name, and give the n
We will furnish the badge for each memb
The Union Pacific management will adm
those having badges. Others will not be
not hand these badges out promiscuousl
ask each member as his name is called t
badges.

The roll was called, and the badges pas
bers. The names of the new members w
they were also furnished with badges.

The President—Gentlemen, I would li
tention for a few minutes, and I will mak
which will interest you all. We have c
attend this meeting, and while we expe
deal of pleasure, we must also do a great
hours of meeting will be from 9.00 to 12.
5.00. Now, for the three days, that wi
hours, and it is absolutely necessary for
present promptly on time. It will not
this long distance, and have it said we d
Therefore, I must beg of each and every
tendance to be present promptly on tin
of our business. If we can do it in two

better. It will not do to have 150 in the city and only 50 present. Our actions will be heralded from the Atlantic to the Pacific. We do our duty at home, and must do it abroad. I think six hours a day is as little as we can have for our work.

It is now nearly 12.00 and we will take a recess until 2.00 P. M.

Adjourned.

The meeting was called to order for the afternoon September 10th, at 2 P. M.

The President—Please come to order. Gentl thank you for being on hand so promptly. It wi us to get through much earlier. The next in ord report of the "Committee on Standard Joints," c committee Mr. Caffrey is Chairman.

Mr. Richard Caffrey, Lehigh Valley—I am prepa to read you the report of the committee, as follows

REPORT OF THE COMMITTEE ON STANDARD JOINTS

To the Roadmasters' Association of America:

Your committee to whom was recommitted the subject of Joints, at the annual meeting of this Association, held at W last year, have given the subject further attention, and now of lowing report:

As it is unavoidable to prevent an opening between the e rails, chiefly on account of the different temperatures to whic exposed, it is evident that a wheel can not pass over this o smoothly as over the rest of the rail.

It is also apparent that the rail from the bolt-hole, nearest it have a vertical motion by the sudden appliance and release of of each wheel passing over it.

This vertical motion coming, as it does, directly on the ti ported joint, will, in a short time, depress this tie, and it will l or no support to keeping up the ends of the rails while the

tion to this, there is a very important consideration as govern-
nvenience and rapidity of laying rails.
nt is cumbersome and in many parts causing slow work in lay-
y making additional cost, that additional cost should be added
e of the joint.
mmittee now believe, from experience, and from knowledge
m others, that a joint should be supported from the bottom of

refore, recommend that a plate of iron or steel extending across
r three ties, as the case may be, be used in conjunction with a
e bar of sufficient length for the purpose; believing, as we do,
late will be of much greater value for holding the ends of the
, than can be produced from an angle bar alone, regardless of

R. Caffrey, Chairman.
E. J. Dorsey,
P. W. McKeon,
J. Hickey,
P. Nolan,
H. D. Hanover,
A. B. Adams.

STANDARD TRACK JOINTS.

sident Your committee, after looking over the resolution pre-
the meeting yesterday, referring back to us our report, are un-
e wherein we can change our former report.
refore, return it to you with detailed drawings of a suspended
same as referred to in our report.
ree-tie joint, we are of the opinion that the details presented by
ity report at the Washington meeting, fully covers the require-
cept the supporting-plate, which we consider worthy of trial;
to be of sufficient length to cover the face of three ties.

R. Caffrey,
P. Nolan,
H. D. Hanover,
E. J. Dorsey,
P. McKeon.

. Courtney—L. S. & M. S.—Before adopting the re-
the committee, I would be in favor of investigating
stion of a bottom plate. We have just been using a
plate, twenty-six inches long, but have adopted in-
long angle splice that will catch three ties, the plate
since discarded. I am not in favor of adopting an-
ottom plate until I know more about it, but am in

Mr. Courtney—I think the long angle prevents
on the rail, which the committee had in view, and t
prevents the wearing into the tie. There is a hing
tion of the wheels passing, particularly when the
one direction. I think this hinging motion is prev
the long splice to a great extent, and, in additio
the rail is sufficiently tight to the ties to prevent t
ing of the rail; and then we have the ties at right an
the rail, in perfect order, which assists in maintaini
—a very desirable thing.

Mr. Jones—Do you think the long angle bar d
with the waving motion?

Mr. Courtney—No, not necessarily, but you certa
a more correct and rigid track than with the s
joint.

Mr. W. F. Ellis—P. & W., and Sec'y of the N. E
—I think I expressed myself pretty well on this s
our last year's meeting. The pamphlet of the pro
at Washington shows me as an advocate of a s
joint, with three ties under the angle bar. I lai
ago yesterday one hundred tons of steel to see if I a
in my impression; but I could not endorse the rep
committee with this plate under the joint, being one
roadmasters who, in the past, have had a Fisher joi

Mr. Ellis - Unless that plate can be placed so that there is no noise from the same, so that the plate will not act as an anvil for the rail to be split at the head from the pounding of the wheel, it is not perfect; these are the two objections.

Mr. Robert Black— I have used the same, only with the exception of the flange on the head of the plate, for over three years, and I never found any of the difficulties to which Mr. Ellis refers, and was much pleased when I heard Mr. Caffrey's report.

Mr. Ellis— Your road being elevated, is the structure of the same any different from the gravel or surface road? Are the difficulties the same to contend with?

Mr. R. Black— I have made inquiries of a gentleman who is authority on joints, and he gives me to understand that these have been in use, if I am not mistaken, twelve to fourteen years, and the results have been good.

Mr. Ellis—What road, please?

Mr. Black - I do not know the road. Mr. Burnett, will you kindly say what road?

Mr. Burnett—Superintendent Joliet Steel Works—Chicago & Northwestern.

Mr. Kindelan—C. M. & St. P.—I fully concur in the remarks made by Mr. Courtney. If bolted to the rail, we may get more strength. I prefer to have them long enough to reach three ties, as Mr. Courtney explained. We have had experience with the long angle bar, and the joint lays better than any other joint as regards wear.

Mr. Ellis—Will the last gentleman please state whether they were of sufficient weight and thickness, so that they could not bend with the track?

Mr. Kindelan - The splices in common use were about eighteen pounds. They were a suspended joint.

Mr. Courtney -L. S. & M. S. It has been said to me that the steel splices in use on the Milwaukee road have been broken to a great extent. I would like to ask to what extent they were broken?

Mr. Kindelan I never knew one of them to bre

Mr. Ellis First, the weight of the angle bar ha
do with its not breaking, you know.

Mr. Kindelan I do not know as to the weight o

Mr. Burnett They are eighteen pounds.

Mr. C. E. Jones C. B. & Q. How long have th
bars been in use?

Mr. Kindelan Three years.

Mr. Ellis—I think the eighteen-pound pair of a
is not strong enough to carry the weight of the e
even the cars.

Mr. Kindelan—Please do not figure at eighteen
the pair. It should be thirty-six pounds. I do
that they were such as were used on the fifty-six-p
They were in use on the Northwestern and seve
roads.

Mr. John Doyle—D. L. & N.—They weighed
pounds.

Mr. Ellis They have weighed thirty-six pounds,
haps the cause of their bending or breaking was in
did not correspond with the section of the rail. Th
be bolted at the head of the rail. I claim that the

e President Have you not had the Fisher joint on road?

. Shea We had some years ago.

e President- Give your experience from the time you t on your road.

. Shea- Well, I can not recommend it much.

. R. Black- Was it anything like that? (Showing pa-

. Shea No; it was the old one.

. R. Black Was it anything like that? (Showing pa-

. Shea--No. Wider, the old one was.

. J. S. Lane - N. Y. N. H. & H. R'y - Mr. President, Mr. H. Mansfield, some years ago, at the time a good railman, put a switch in and used it on the Mansfield track. is made of steel, with plates underneath, having a cer- amount of width to avoid friction, and then another , and then the running part was cast steel. He in- ed a chair and put a tie under the chair, where it was ssible to keep up the joint. I thought the old man had his fortune, but it was not three years before the chair to rattle, and every one was taken off. On the road I am we use the angle bar suspended joint, and since we have increased the bar, making it heavier. We had no difficulty in breakage.

- J. R. Patch Connecticut River R'y—I have had no rience with the plate under the joint, or between the d the rail. We used 24-inch angle plate weighing 38 ds to the pair. We have had them on the 66-pound and on the 72-pound rail, and they are in use on thirty s of road. I commenced using them five years ago. have never had a broken joint on that track since their We have had no trouble in keeping our joints up. We a suspended joint, and I think from what I have seen the 24-inch joint weighing from thirty-eight to forty- pounds, lined as a suspended joint, is the best joint that yet been devised.

The President—I do not like to call upon each memb r by name to discuss this subject. The committee have pr sented this report, and if not adopted, it is right and prop that the Convention here, as well as the railroad worl should know the reason why. We have a suspended joi to consider, and I beg of each and every one of you, do n wait for me to call your name, but when you have an oppo tunity, give your reason why you would not admit a joi with a plate under it.

Mr. Ellis—Let me give a reason or two. After they ha been in a short time there will be a clattering of your ra with the iron of the plate, which will create a disagreeab noise to passengers riding in the cars.

Mr. W. H. Clark—Ver. V. & S. Co.—I would say th about eight years ago, I had a track on a heavy grade, a in order to keep it from creeping down the hill, in additi to the old-fashioned Fish-plate, I placed some chairs unde neath. Last year I removed it because it had worn out, a two-thirds of the rails were worn out by the pounding, whi the track adjacent to this was perfect and in good shape. think it operates as an anvil pounding the rail, while on M Black's road he has nothing of that kind.

We are using now the angle bar of which Mr. Pat speaks, and I am thoroughly satisfied with it. In order keep the track from creeping, the long angle bar would better in certain places, for you get three ties instead of tw which assists in holding your rails from creeping.

Mr. Burnett—If you still use the bar slotted in the cent and spike the tie through this slot, do you gain anything h the use of the long angle bar?

Mr. Clark—No, sir.

Mr. Ellis—Where you used that plate on the end of he rail, were not a good many of those rails split at the he d?

Mr. Clark—Yes, sir. They were split, many of them.

The President—I would like to hear from Mr. Caffrey on this subject.

Mr. Richard Caffrey—I have had experience with he plate under the rail. We have had some 40-inch angle b ars.

I think we had about twenty miles put in three years ago, and I found considerable trouble with them. I laid it more to the angle bar being uneven than anything else. It was not true, and when tightened up the angle bar would twist the rail out of shape, and we had trouble in making a nice track. Again, I think we make the joint too tight, and that is why the rails would kink, on account of not having room for the expansion of the iron. I understand the Company I am working for have abandoned the long angle bar and adopted the 24-inch angle bar, slotted at the center and a tie on the joint.

The President—We are now discussing whether or not the plate should go underneath the joint, and must not discuss anything foreign to that.

M. J. McInarna—N. Y. P. & O.—In regard to the question of putting the plate under the joint, I am decidedly opposed to it. I do not think it is a good plan. I have always been in favor of putting plates under frogs, from the fact that it keeps all parts of the frog on a level, but with the rail it is entirely different. If you put a plate under the joint on the rail you have the action of an anvil there, and my theory is that the track would be more liable to spread than if laid on the timber, because there is more friction on the timber than on smooth plate.

Mr. Burnett—Did you ever use any of the Fisher joints?

Mr. McInarna—I have.

Mr. Burnett—How do you like them?

Mr. McInarna—First rate; there is no plate between the chair and the rail.

Mr. Burnett—If the rail was secured to the plate, you would favor it?

Mr. McInarna—Yes, sir.

Mr. C. E. Jones—C. B. & Q. Was it not the intention to leave the angle bar on the rail?

Mr. Caffrey—Yes, sir, and fasten the plate to a tie by a spike.

Mr. J. M. Neale—C. K. & N. Do you think it a fair thing

The President Yes, sir.

Mr. Neale And it is hardly in place for a membe press an opinion about this plate who has had no exp in using it.

The President -All members of the Association a tled to express an opinion, whether they have had perience or not. We can not take two or three and the balance.

Mr. Neale —We would derive benefit and knowled those who have handled it, of course. There is a q whether these young men can give any information ing it.

The President- They being in the minority woul to go with the majority. It is the only way that can b and in that manner can be made perfectly fair for al

Mr. Ellis- Judging the report as interpreted, it seem that we would have to rely on four spikes to h rail resting on the ties. Those gentlemen, in the pa ing a chair for a joint, or plate for a joint, will agr me that the vibration creates a tendency to have the work up. In the slots more quickly than on the oth of the rail is this noticeable, which tends to make th loose, and I can not see how they have provided for

tisfaction of any joint on the road for that length of
The present joint has been in use about seven years,
s given better satisfaction, even, than the first joint.
tisfaction that this gives is, that when riding on an
, I cannot tell the joint from the center of the rail,
e wear in keeping up has been at least 50 per cent.
an with the others.

Purcell—J. M. & I. R'y—I think the question before
use devolves upon the affirmative to prove the neces-
r this plate, and it devolves upon the negative to
hat there is no necessity for it.

not think there is any necessity for this plate. First,
lying the cost, it would take more money to furnish
plates. Applying that money to the surface, the line
k, I think would be the better way. We use a 38-
splice, a 60-pound rail, and never a break or a bruise.
ere I do not keep them in good surface, we have them
. With a splice of a proper size for the track, in
urface, I see no reason why one part of the rail should
an iron plate under it more than another. I think
ould be equal, thus making the bearing even. This
demonstrated by putting in at different places chairs
the rails.

President—For the satisfaction of the gentleman
ng last, it was asked whether it would be proper for
nen having no experience with the plate under the
o discuss this question. I think if we have ten men
Association, who have a plate under the joint, and
re satisfied with that plate, I would like to ask that
man whether that would satisfy this house? The
al evidence of members is desired of those who have
perience.

Purcell—I do not understand the remarks.

President—It was asked a while ago if it was proper
ember to discuss a question who has had no experi-
ith it. If the house is divided, say ten against ninety,
he gentleman think that the members not allowed to
ss their opinion would be treated strictly fair?

Mr. Purcell -I understand that this committee had reported on that subject, that they have had experience, and that it is not best to leave the discussion with men who have had little experience with it.

Mr. J. N. Preston-- C. R. I. & P. R'y -That is the point wish to make, that the committee have had experience wit the plate under the joint, but they are a long way in t minority, and if those in the majority cannot discuss th matter, they can cast their vote, and the minority will over-ruled. Furthermore, the subjects of this Association for discussion, are decided upon by the Executive Comm tee, who prepare what they consider, from information a opinion, a report to meet the wishes of the Association. is not by any means the voice of the Association, and it in order and within the province of any member of this A sociation to offer a substitute, amend or change in any w the report of the committee. The report is not final by a means, till it is discussed and passed upon by the Assoc tion.

Mr. McInarna The questions are reported upon by di ferent committees, who meet and recommend a certa method ; they may be working on a single rule or idea, a they may err and know no better. While in the discussi it may appear that their report is not right, neverthele many points will be brought out by comparison and sta ment of experience, which is the only proper way to c sider them, and for that reason each important sub should be thoroughly discussed.

Mr. Bishop was called upon by Mr. W. E. Clark others.

Mr. Bishop Fitchburg road and President of New Association I realize that I meet with much oppo here in my views. Therefore, I wish to have what I c go on record as I say it, so that in the future, if requ may know just what I did say, and I do not intend anything here I can not prove.

The Fitchburg road has 513 miles of track, of wh miles are spliced angle bars of all sorts and sizes.

nainder of the track is all laid with the Fisher joint. I have had charge of this work of the division fifteen years last January, during which time I had a long experience with the Fisher chair, more than we have had with joints on the Fitchburg road. I hold the improved Fisher joint as the standard joint, and we are of the opinion that there are many reasons why it is the best joint in use. In the first place, I would use it with a plate under the rail, suspended by two ties, which is the proper mode of supporting a joint; further, we think that when that plate is sufficient to carry the load and do the work required of a joint, that the angle-plate is useless; we have no further use for that.

The rail with the Fisher joint is one clipped at the corners on the web or base, to allow the U-bolt to pass up through the joint. Mr. Turner, our chief engineer, informed me a short time ago that nine-tenths of all the broken rails in the Fitchburg road broke in the angle bar, or splice joint, while the other tenth was in the Fisher joint with that rail with a slotted pad at the head of the rail as they supposed then, from creeping. It saves many broken rails. I conider the Fisher chair the strongest point in the track as regards surface line and gauge; for, when inspecting the track, you will find on the outside of curves a great many spikes that are drawn out by the motion of the train, while the Fisher joint stands to gauge. I find in surfacing track more low centers than low joints, and consider the joint the easiest part of the road to keep in surface -you only have two ends to keep tight, while with the angle bar, with from four to six bolts, you are in further trouble with bolts and nuts. The joint, as used now, has a steel spring underneath, held in position by a slot in the spring filled with the link, which keeps a steady bearing with the lip on the web of the rail; consequently, we have little trouble with loose bolts on that joint.

Now, I think I have said enough, and if any member has any question to ask, I will stand here and answer it.

Mr. Wm. E. Clark V. & S. While comparing roads, I think the Fitchburg used the Fisher & Norris chair, and has

Clark was on the Troy & Boston road before the Fitc road had that track. I do not know but since they had the track they have striven to put it in good con and maintain it equally with any other part of the Fitc road. We have a broken rail or two occasionally, yet to keep the road safe.

Mr. Ellis— These rails are broken through the slot rail, 90 per cent., I think. Did not these rails have a them?

Mr. Bishop— I am correctly informed that the bre commenced with the head, down through the throat rail. In one instance it commenced at the heel of th caused by punching or drilling, I could not say whic

Mr. Ellis— Do you not think it was caused by bad

Mr. Bishop—I could not say as to that.

Mr. Jones— Mr. Bishop should answer that questio stating that nine-tenths of the breakage was on the bar, etc. Was the rail on the angle bar in proper con and care exercised equally with the track that had the er joint?

Mr. Bishop— While that is not exactly on my progr I have as fast as possible put that joint in equally goo

Mr. Jones—A gentleman spoke about a young Roadmas-er knowing nothing of the plate. I am not very old, but I ave seen the day when I was one of a gang on the section, n the Northwestern road, and I would now compare it with ny road.

Mr. J. M. Mead—A. T. & S. F. R'y—This was the result f economy, no doubt, and these are days of economy, and e wish to know the cost as well as which is the best.

Mr. F. C. Clark—Housatonic, Conn.—Mr. Bishop, about he 90 per cent. of rails being broken—did you refer to the hole road or to your division?

Mr. Bishop—I referred to the Fitchburg system.

Mr. F. C. Clark—Did not that combine the part of the oad to which the gentleman referred? Was not the large sses of breakage due to the condition of the road, to a reat extent, or to the style of joint?

Mr. Bishop—Perhaps you can answer that question better han I, because you were Roadmaster on that road before he Fitchburg got hold of it. (Merriment.)

Mr. F. C. Clark—I did have a portion of the road laid ith the Fisher & Norris chair, and while it gave better atisfaction with good material under the track, with the ind of material we have, the nature of those chairs becomes a fulcrum so that it would drive the end of the rail up. would like to ask, Mr. Bishop, if you do not know that hat road was neglected from the time it was built until the itchburg took possession, and that the breakage on these oints was caused by that neglect?

Called to order on the ground that the Fisher joint is not nder discussion.

The President—It is only mentioned in this manner to illustrate the ideas.

Mr. Kindelan—In 1879 I had a road furnished with the Fisher joint and rails, and they had the rails spliced, and my experience was that it required a plate under the rail, otherwise they would hug and bang, as Mr. Lindsley explained, and be an additional cost to the track. They make more work for track men. In fact, they are superfluous.

is supported on the bottom with bolts and a
do not find that deflection that you do withou
the plate is secured to the angle plate. I do
the noise comes in.

Mr. Mead— Mr. Black, will you not exhibit
thus illustrate your argument?

Mr. Burnett —This plate is mine. I broug
here, not knowing or having any idea how t
was going to report, simply to show a joint t
have shown and explained it. When I arrived
the committee had made a report recommendi
brought. It was not the committee that produ
but myself.

Mr. R. Black -When I saw the plate, and
members, as well as myself, made inquiries, I e
it, and can explain it to them, although I
plate until this year. I will explain it, Mr.
your permission, for the information of the me

The President Mr. Burnett, who brought i
be able to explain it better.

Mr. Burnett Referring to this plate (showin
channel plate (indicating); the report does n
After considering upon this plate, I thought it

sincerely hope you will find it, and when found the Company you represent will gladly adopt its use. Who knows but that the very thing you are seeking for is in use to-day? I can say that during my years of track work I knew in what manner I wished my work done, and what form and section of rail and rail joint I used upon the road I was connected with, but rarely, if ever, knew what were used upon other roads and by other Roadmasters. Why? Because I had no time, I thought, to go and see what other people were doing, and I presume it is the case with many of you, and until the organization of this Association we were strangers to each other. Gentlemen, to obtain the results you seek and work for, you must have, 1st, a good solid road bed, well drained; 2d, good ballast and ties; 3d, perfect rails of modern designs, perfect in chemical and mechanical construction; then come the joint and fastenings. Referring to the mechanical construction of the rail, which, I believe, consists of a rail from perfect rolls, free from flaws, perfectly finished. However, there is a difference in opinion as to the finish of the rail. One inspector desires them finished slightly cambered from end to end, ½ in center. Let me ask how many Roadmasters present would desire to have their rails finished in that way? Another inspector wishes them finished, *say ½ to* ¾ of an inch low in the center, with a true downward sweep from end to end. Are there any present that would wish their rails finished in that way? While others wish them *practically straight*. How many of you would prefer your rails finished so? Rail joints seem to offer attraction for the inventor as well as Roadmasters; while the increasing of the metal (in the angle bars) in the past few years, and substituting steel for iron, has so improved the angle bar that it still continues the favorite.

If a joint has 25 per cent. greater resistance to the vertical load than the rail itself has, it is sufficient, don't you think? Why do joints become low? I believe there are several reasons for this. During the heat of summer the rails expand and joints become tight and appear low, yet if you raise a joint the center will go up with it. Why is this true? Isn't it because the head of the rail, being exposed more to the rays of the hot summer sun, becomes much hotter than the web and flange, and necessarily expands more, and in so doing has a tendency to camber the rail? In the frosts of winter do not the web and flange of the rail take a greater degree of frost from its construction and location being close to the earth, causing it to contract more than the head? At least, from the fact of the flange and web being much thinner, they will contract quicker than the head of the rails. If this is true it has a tendency to camber the rail. Again, if the metal flows under the wheel load it will camber the rail. I have removed rails of three or four years in service, and laid them bottom of flanges together, and found from 1 to 2¾ of an inch of a camber. You can't find a joint to prevent this. Don't look for it. That is not due to weak joint fastenings, rather to the crowning of the rails from above and other causes, and when once so cambered perfect joints cannot be *maintained*. Therefore, I would say, in the finish-

during the winter months. Several roads that have used
bar, from 38 to 44 inches, have found them wanting, and ha
to their first love, the 24-inch angle bar and suspended jo
believe that it is not the true principle to support a rail
head, it would seem desirable to support the joints from tl
learned of a peculiar joint being used upon the Chicago &
road, and wishing to learn something of its merits, I walke
miles of track laid in 1875. Fourteen years ago the weight
pounds per yard. When new the joint referred to consiste
bar 13 inches long, with a surface plate laid upon and cov
making a suspended joint. The surface plate was punch
of the angle bar, and the spikes were driven at this joint
the angle bar, but close to either end, to prevent creeping c
rail had one bolt only. I saw but very few flattened rails,
but a splendid piece of track fourteen years in service and
traffic, sixteen passenger trains daily, no broken angle ba
face plates. I was informed by the Chief Engineer that
that surface plate for many years in connection with 12 and
bars, and that they had received the best results from this
This year they adopted this channel plate (showing plate)
dard in connection with a 24-inch angle bar, it giving bett
than the long angle bar, which they have now abandoned.

In my opinion there can be no value in an angle bar a
support of six inches from the end of the rail, only for
number of bolts in the joint; and is this desirable? I woul
to support the joint from the bottom with a channel plate r
rail, and to use as short an angle bar as possible, not exce
four inches and made of steel, suspended joint. The joir

in explaining the tests to you. And I will say in this connection that an angle bar, slotted in the flange at the center of the bar, it being at the joint where the tension is centered, is wrong. When the load is applied the bottom of the bar is in tension from the first pound applied, while the web of the bar, or that part fitting underneath the head of the rail, is in constant compression; therefore, the punching of the bolt-holes through the web is less damaging to the bar than to slot the web. This is the cause of angle bars breaking from the bottom up. You reverse the order of things and apply the load to the bottom, and your bar would break from the top through the bolt-holes, that being the weakest point. Therefore, to slot an angle bar in the flange, at the center, destroys from thirty to forty per cent. of their value, particularly so when made of steel.

Gentlemen, if you will give me your attention a few moments longer, I will explain to you the result of the tests I have made.

Test No. 1.--Steel angle bar, twenty-four inches long; weight, per pair, forty pounds, Chicago, Rock Island & Pacific standard bar for seventy-pound steel, was placed upon 12-inch supports, and a load of 60,000 pounds applied, showing no deflection; then increased to 70,000 pounds, with no perceptible deflection. I then increased the load to 100,000 pounds, showing a deflection of 3-132 of an inch. Upon releasing the load, it recovered instantly.

Test No. 2.--Steel angle bar, forty-four inches long, seventy-six pounds per pair, J. T. Clark's patent taper-bar, Michigan Central R'y standard for 80-pound rail. This bar, from drawings furnished the manufacturer by the Chief Engineer, was to be slotted at the center, or nearly so. This bar was placed on 16-inch supports, and when a load of 62,000 pounds was applied, the bar broke from the center slot. At the point of breaking there was no perceptible deflection.

Test No. 3.—Joint same as No. 2; 16-inch supports, and when a load of 70,000 pounds was applied both bars broke from center slotting, and from the bottom up.

Test No. 4. Joint same as Nos. 2 and 3, except the bars were *not slotted* in the *center*, and placed upon 16-inch supports and a load of 100,000 pounds applied. It showed a deflection of 9-100 of an inch; then the load was increased to 192,000 pounds. Joint took a permanent set of seven-eighths of an inch, measurement taken from supports, and at this deflection the bars showed no trace of a fracture, and the bottom of the rails separated three-fourths of an inch, causing a heavy tensile strain.

Test No. 5. Michigan Central joint, same as Nos. 2 and 3, with this exception: The bars were planed away from outer edge of flange to ¼-inch back of the slotting; then placed upon 16-inch supports and loaded to 90,000 pounds; deflection very light; then the load was increased to 135,000 pounds. At this point one of the bars broke at its weakest point, the bolt-hole; deflection at center of supports seven-eighths of an inch. Bottom of rails at the joint separated 1 1-16 of an inch.

Therefore, I say that when you slot a steel angle bar you

per cent. of its value.

Mr. I. Burnett (Continuing) With your kin
sion I will also read the following letter written
subject by Mr. Fred. A. Delano, well known to
article I consider worthy of your consideration.
as follows:

CHICAGO, Sept

Mr. I. Burnett, Vice-President Roadmasters' Association of

DEAR SIR Since you have been kind enough to ask
paper on the subject of "Rail Joints," to be presented at
meeting of the Association, I feel bound to make some
even though mine would more properly be the place of the
not the preacher.

I shall try not to encroach too long on the privilege you
me, and shall make my dissertation short, for the double adv
over-tiring those who do not agree with my conclusions, and
time of making those who are good enough to bear with me
to listen to me again.

After considerable thought on the subject, I have come
sion that the requirements of a perfect rail joint may be e
follows:

First. The splice bar must hold the two ends of the rail
level, not allowing the slightest depression in one end with
depression in the other.

Second. The strength to resist a vertical stress or shock d
the joint should be fully [illegible] per cent. greater than the streng

The joint device should not require a form of rail which is un- al in the disposition of metal, or which, for any reason, is not as ed as another form.

ition to this, there is also that very important consideration, the nanipulation, as governing the convenience and rapidity of lay- . Thus, if a joint is cumbersome in many parts, and slow to lay h, such disadvantages should be taken into account in figuring ost of the joints.

g briefly over this list of requirements in order, let us consider l points and the bad of the common types of joints now in the

The fish plate and angle bar type meet the first requirement l while they are new, and the bolts are tight; but if, from any e bolts get loose or broken, the two rail ends are not held at the ight; or, if the joint is neglected, the bar is nicked or bent and once its principal value, no matter how much attention it has ds.

1. All fish plates and most angle bars are sadly deficient in , making the strength at the joint only partly as strong as the he rail, whereas it should be some 25 per cent. stronger than the the rail. With rail sections having wide, thin heads, which are g so widely adopted in this country, it is possible to make the r far stronger than it has been possible to do with rails having l narrow heads; but, after all, the strength of the angle bar is ctive when the bolts hold it tight in its position.

Every Roadmaster knows that fish plates and angle bars, when olted up, do not meet the third requirement, and it is well known e track bolts are too tight in summer, the angle bars clutch the so much fierceness, that the track is liable to be kinked or sooner than let the rails take up the full space which has been expansion. Knowing that this is the case with angle bars 26 ng, with four bolts, it seems to me poor wisdom to make the bar inches long, with six bolts. Indeed, it seems to me that this of expansion and contraction in rails is too little regarded in the ation of rail joints, and many of the patented devices, which aim the faults in the angle bar type of joint, tumble into the fault g no provision for the unhindered expansion and contraction . One much heard of and advertised device, while containing od features, allowing free expansion and contraction, placed no the distance apart that the rails might be. In this respect the r is good and prevents creeping, especially if anchored to three me of the patented devices attempt to hold the rail from creep- otching it in the flange, which is, of course, a bad practice, as it he rail very liable to break through the notch.

Angle bar and fish plate joints are at fault in respect to the fifth nent, inasmuch as such a type of joint requires flat fishing angles, (the more nearly horizontal the better), small internal fillets, so as to reduce the area of support as little as possible, and small corner fillets to increase this area of support as much as possible. To make a rail for the angle bar involves a sacrifice, unquestionably, and while I am not prepared to say that the sacrifice is not worth making, I do think it is one which should be admitted, and its value in money, as nearly as it can be estimated, added to the cost of the joint, when considering it in comparison with other devices.

Sixth. Lastly, to take up the question of the ease of manipulation, etc. Probably nothing will ever be made which surpasses the angle bar or fish plate joint for convenience in rapid laying, and unquestionably the extra time and labor incident to laying rail with other devices should be charged as part of the first cost of the joint.

Balancing all these considerations, I am inclined to think that the perfect joint has yet to be devised, and it is not certain that anything has been produced to excel the angle bar in certain forms. For light railways, such as a greater portion of the mileage covering the prairie country, I am inclined to think that the angle bar joint will be always used; and the kind I should favor is the shortest 4-bolt angle bar that can be used to cover three ties, huddling the ties at the joint as close as is possible for good tamping, on the principle that the joint cannot be held up, no matter how good the fastening, unless the foundation is there to hold it. In connection with this, I may say that I have recently recommended the use of a 32-inch splice bar, to be used as a three-tie joint, setting the shoulder ties 15 to 16 inches center to center from the joint tie. On single track this sort of joint should be laid broken jointed, but on double track square jointed, unless the ballast is extra good, or a short piece of angle bar is bolted in the center of the rail to prevent the skewing around of the ties.

From what has gone before, it will not be supposed that I consider such a joint *perfection*, but rather that it is suggested as possibly the best kind of joint for light rail and cheap lines, doing a light traffic at starvation rates.

For main line use, where the traffic is heavy, I think that the angle-bar joint will have to be either displaced altogether or reinforced in some way. If the rail is not to be held up by its shoulders, it must be by placing the support under the broad flat base; yet as soon as we do this we meet the difficulty of making the device very unhandy and cumbersome. Many joints have been produced, some of which show great ingenuity, but the best of these have not been tested long enough to demonstrate their value. Besides this, as rail joints are now being invented at a rate which is truly astonishing, and possibly never eclipsed except by automatic car-coupler devices, there is hope that the keynote will sooner later be struck.

I am watching experiments on some of those joints which have seem to give promise of success with a good deal of interest; but if bad co to worse, and nothing else is found, I shall be disposed to try a combination of the two principles, the angle bar and the base plate. For example: Use a rolled plate seven to eight inches wide, covering two ties, flat on the bottom and recessed on the top with a shallow channel, which shall just admit the base of the rail; then, in addition to this, use a short 12-inch two-hole angle bar with broad flange, which will permit that one short bolt on each side (staggered in relation to the rails) be bolted to fasten it to the base-plate through its thickened edges.

I should not be surprised to see some such compromise as this adopted after a few years of trying patented devices. The fault of the angle bar, more particularly in the suspended joint, lies in the fact that they need constant and unceasing attention to give good service. If, for any cause, the joints get low and are left so, the angle bar becomes nicked or bent, and after that no amount of attention will make it a perfect joint. It is then that the usefulness of the joint tie, in the supported joint, or of the sub-plate, in the joint I have described, is evident. So long as the ends of the rails are supported, a low joint can always be brought back to surface; if not by raising it, then by lowering the ties in the body of the rail.

The advantage in combining the two principles will be found especially important in laying track. The rail could be laid with the angle bar, and subsequently the sub-plates could be put in. At the same time, the angle bar is too short to interfere much with the expansion, while the distance apart that the rails can run is limited. The base plate would last practically forever (possibly requiring straightening, if it became bent), so that due allowance for this fact should be made when comparing the first cost with that of angle bars alone, which, of course, do not last a great length of time; in fact, deteriorate rather rapidly.

It should not be forgotten that one reason that angle bars have not given better service is that everything in connection with the joints has been mechanically crude, with no attempt to precise accuracy. The holes in the rail are drilled with the greatest disregard for small fractions; and when three holes are drilled in each end, the main object of the rail mill and the inspector usually is to have the holes big enough, the experience being that if the holes are big enough, so that the bolts all go in easily, no fuss will ever be made. The button-head bolt is also a very unmechanical arrangement, because both the inside and outside angle bar are punched to allow for ovalness in the shank which only occurs on the head end. It seems to me that the bolt-holes in the rail should be drilled with twist drills and through steel-bushed templates, and then with carefully-punched or drilled angle bars and square head-bolts. This style of joint would stand upon its merits. At the present time, although the importance of accuracy seems so obvious, it is one of the hardest things in the world to obtain.

Last, but not least, good joints depend a great deal both on the man who lays the steel and the man who takes care of it. Rails which are laid one-quarter of an inch apart in midsummer, when they should be

center. I do not mean by this that the rail should show
the track, but simply that when on supports fifteen feet apa
and a half feet from each end the rail should be hollowed e
one-fourth to one-half an inch lower at the center than at the

As I have already said a good deal more than I intended,
here, rather abruptly, it is true, but perhaps none too soon.

Wishing you a pleasant trip and a successful as well a
meeting, I am, Very cordially yours,

Fred. A.

During the reading of Mr. Burnett's argument,
was made to it by Mr. Jones, on the ground that t
of the plate was foreign to the report of the comm
Mr. Burnett was allowed to proceed.

Mr. Burnett Gentlemen, in connection with m
on Standard Track Joints, read immediately prec
letter from Mr. Delano, I will say that I have m
mechanical tests of angle bars and joints, and if
give me your attention for a few moments longer
plain to you the results of the tests I have made, a

Test No. 1. Steel angle bar, twenty-four inches long; w
pounds per pair; Chicago, Rock Island & Pacific Railway s
70-pound rail, was placed upon 12-inch supports, and a loa
pounds applied, showing no deflection. I then increased the l
000 pounds, showing a deflection of 1-32 of an inch; upon re
load it recovered instantly.

Test No. 4.- Joint same as Nos. 2 and 3, except the bars were not slotd in the center; joints placed upon 16-inch supports, and a load of 100,o pounds applied, showed a deflection of 0-09 of an inch; then the load is increased to 192,000 pounds, when they took a permanent set of ven-eighths of an inch; measurements taken from supports; and at this flection the bars showed no trace of fracture, and the bottom of the ils separated three-fourths of an inch. This test gave a heavy tensile ain.

Test No. 5.- Michigan Central joint, same as Nos. 2 and 3, with this ception, viz: The bars were planed away from the outer edge of the nge to ¼-inch back of slotting. These bars were placed upon 16-inch pports, and loaded to 90,000 pounds; deflection very light; then the ad was increased to 135,000 pounds. At this point one of the bars oke at its weakest point, viz: the bolt-hole; deflection at center of suprts seven-eighths of an inch; bottom of rails at the joint separated 1-16 inch.

Test No. 6.—Was a test made of Michigan Central bars, same as Nos. and 3, by placing them under a hammer, with supports about eight ches apart, and laying a piece of round iron on top of the bar, directly er the slotting. The bar broke, as you see it, from one blow of the mmer, about 600 pounds; then the bars were moved and supported tween the first and second bolt-holes, and struck six blows at one end d five blows at the opposite end, placing the bar in the position that u see it. No fracture can be found at either point.

As a result of these tests, I say that when you slot a steel angle bar u take away 40 per cent. of its value.

Mr. McInarna—In making those tests, did you have suprts placed the same for each?

Mr. Burnett—The piece of rail I had for the 24-inch bar ad to put under the 12-inch.

Mr. McInarna Then the test is of no value, as the benefit tained from the 44-inch angle splice is accounted for by ie under the joint, and unless the gentleman can show the nvention that a long splice put under the same ties, as he d with the short splice, his tests are of no value.

Mr. Burnett—My object in testing the joint was to find ut how much it weakened the bottom to slot or splice in he center.

Mr. McInarna—Why not slot first with the suspended joint?

Mr. Burnett—These were ordered slotted at the center and at the ends of the rail. Now, so far as that surface-

Mr. Ellis One joint?

Mr. Burnett Yes, sir.

Mr. Ellis Why did you have it changed fro inch angle bar?

Mr. Burnett—Yes. And why from a 24 to a 4 for experimental purposes.

Mr. Ellis—In the trips you have taken with ing at rails and joints, did you not find in use as for the number of miles in New England, takin burg road, the Boston & Providence and others, find as many of the Fisher joints in use as in the country?

Mr. Burnett—I found many of the Fisher joi for a single plate of that kind.

The President—All that has been stated has n and yet the report of the committee is not what calls for. It says "Standard Track Joints." T tee, after going through all the varying conditio a low joint. They recommend a remedy, and last paragraph, which reads as follows:

"We, therefore, recommend that a plate of iron or st across two ties or three ties, as the case may be, be used i with a steel angle bar of sufficient length for the purpose we do, that this plate will be of much greater value for hol we do not put a plate under it, have we a standard joint? Yet we can have it without or with it, as the Association may decide. But as this report has not been before the house, it would amount to nothing to go before the world, and it is in order for any member to offer a resolution for what the report calls for.

Mr. Lindsley—I would like to ask this Association, if it is policy for the convention to adopt any joint? I have no objection to the convention recommending any joint, but all roads can not use the joint we adopt.

The President—We do not adopt anything, but recommend. We do not carry with our Association authority. In he relations between this Association and those of the Superintendents and General Managers, Mr. Lindsley speaks of, I will explain further regarding it.

Mr. Lindsley We discussed these matters last year, and adopted a standard joint, if I remember rightly, and adopted standard tie.

The President—Recommended it.

Mr. Lindsley—Adopted, I understood.

The President—It was with recommendation only.

Mr. Lindsley—I think perhaps we should have discussed what is the most economical joint, and adopted nothing.

The President—It is only for some gentleman to say what disposition shall be made of this standard joint.

Mr. Clark I move that the report of the "Committee on Standard Joints" be accepted. Motion not seconded.

Mr. J. W. Craig—Mr. Burnett in the chair—I will offer he following:

"*Resolved*, That the report of the Committee on Standard Track Joints be referred back to the committee, to report to-morrow afternoon more detailed specifications for a complete track joint that can be recommended, and that their report have drawings; and also that the committee state, in their report, the evidences upon which the recommendations are based."

Seconded and carried.

The President—In the chair—A gentleman made a motion just now to lay the report on the table. You all know what that means in parliamentary usage. I do not think we come here to lay reports on the table. If for that, we will not last as an Association very long. We must certainly show the world we can dispose of subjects in hand. I do not like to see it. It is a motion, once seconded, admits of no discussion.

It must take the course of the mover in the progression of the business of this Association, and in all probability that subject would never come from the table, unless there was an absolute necessity for so bringing it. [Applause.] I hope that motion will be very rarely made.

Mr. Clark—I would say in explanation of that motion before this convention, it occurred to me that it would either have to die a natural death, or be called up from the table when the convention had arrived at a conclusion as to what they wanted, being yet in session.

The President I will state for the information of the gentleman, that this is not the first meeting at which the question of "joints" has been discussed and Robert's rules of order obeyed. If put upon the table, we can not take it u until one year hence. That is the reason I made the explanation after your motion. It was reported on at the Washington meeting, and is now brought to this meeting. If n adopted here, it shows the world we are lacking in som thing which prevents our properly discussing this subje at this meeting, as I do not deem it a proper thing to car such a subject over for three years.

The next subject is the report of the Committee on L bor on Tracks, Mr. O. F. Jordan, Chairman.

Mr. Jordan M. C. R. R. I am not prepared to repo as two of the gentlemen are not here.

The President—You have a majority of the committee; g ahead.

Mr. Jordan The following is the report:

LABOR ON TRACK.

Your Committee on "Labor on Track - labor required under varyin conditions and proper length of sections, first taking into consideration safety, and second, economy;" with this in view, submit the following report:

o begin, we divide the different roads into three classes :

Roads with heavy tonnage and fast trains.

Roads with moderate tonnage and fast trains.

Roads with light tonnage.

he objects of a Roadmaster (we may be allowed to point out) are :

To render the road as safe for the purpose of traffic as the attend- conditions allow.

. To bring up to and maintain it in as high a standard of excellence possible.

. To carry out the two preceding conditions at as little expense as ıld be consistent with safety and economy.

.ll roads should be divided into sections, as to the length of which r committee will refer later, each section to be under the control of a ion foreman. As to the qualifications of such a foreman, your com- ee will say nothing further than to recommend that he should be in- gent, experienced, and capable of controlling the employes under in such a manner as to cause as little dissatisfaction as possible, and erform the work necessary to his section thoroughly and with dis- h.

l extra work, such as laying new rails, ballasting, putting new tracks switches, building new fences, etc., should be done with extra men. e following table will give the kind of ballast, length of sections, average number of men required under the varying conditions, as mmended by your committee :

SINGLE TRACK, FIRST CLASS.

Kind of Ballast.	Length of Section.	Average No. Men.
el, sand or cinders....	5 Miles.	5
e....................	5 "	7
n.....................	5 "	5

DOUBLE TRACK, FIRST CLASS.

Kind of Ballast.	Length of Section.	Average No. Men.
el, sand or cinders....	4 Miles.	6
e.....................	4 "	8
n.....................	4 "	6

SINGLE TRACK, SECOND CLASS.

Kind of Ballast.	Length of Section.	Average No. Men.
avel, sand or cinders....	5 Miles.	4
ne....................	5 "	6
am....................	5 "	4

Kind of Ballast.	Length of Section.	Average
Gravel, sand or cinders....	6 Miles.	
Stone....................	6 "	
Loam.....................	6 "	

The above number of men should be distributed during tl seasons of the year, as the climate and circumstances requir

We are of the opinion that it is absolutely impossible, havin the number of men allowed, to keep roads ballasted with loar condition the year round, as roads ballasted with gravel, sand stone.

O. F. Jordan, M. C. R'd. C
J. R. Patch, Connecticut I
C. E. Jones, C. B. &. Q.;
W. J. McInarna, N. Y. P.

The President--You have heard the report of th tee. What will you do with it?

The report was accepted and the committee di

The President The question is open for discus is, if any of you desire further labor than is shov report ; then those representing a claim for mor themselves upon record.

Mr. Meade Allow two men to the mile on dou I see the report requires eight men for four mile I do not think that four miles of rock is equal to e

men and a foreman to a section of five to six miles,
el ballast, and they take good care of it, and I think
is sufficient. But they are not always permitted to at-
to their work, often being called to do this, that and
ther; but if left alone, three men and a foreman will
good care of a 5½ mile section of gravel track.

e President--I will say for the benefit of Mr. Ramsey,
no gentleman is out of order who wishes to offer an
ıdment. If the chair will not accept the amendment,
then decided by the convention whether they will adopt
of the report or not. We must recommend something;
ther the management will allow us to have it, is another
g. Mr. Meade will please write out his amendment.

r. Meade--I would recommend that on double track six
for four miles, instead of eight men.

r. Jordan—I think the gentleman offering the amend-
t is mistaken.

r. Meade--No; you misunderstood me.

r. Jordan—The report is all right, I think.

r. Meade—The more men we have the better track we
.

r. Purcell--Then why not take enough men for that pur-
?

r. Jones--If we wish to get the exact wishes of our su-
ırs, we should run with them, taking their report and
pting it for our report.

r. Doyle--I think that report is correct according to
ıture: "Ask and you shall receive." [Laughter.]

r. Lindsley--I can see some defects in the report of this
mittee. I think the number of men required is enough
he Northern States, where it is frozen up four or five
ths in the year. Am I to understand they are going to
that number the year around, or in certain seasons?
he Southern States they would need the same number
nen the year around, where there is no freezing, but I
k there should be some difference made between the
th and South.

The President—You have heard the amendment. Is there any second? There is no second. Therefore, we have the report of the committee without change. Mr. Lindsley, do you wish to offer any amendment? Is there any further discussion to be had? [Cries of "Question."]

Mr. Lindsley—I was going to say that it would be better to amend in that report the distribution of labor in summer and winter, and assign so many in the Northern and so many in the Southern States, though I do not wish to interfere with it personally. It is admissable for you to do so.

Mr. Doyle—This covers the point Mr. Lindsley object to: "The above number of men should be distributed during the different seasons of the year, as the climate and circumstances require." I think that covers it.

The President—Yes, sir.

Mr. McInarna—I have seen the report and think that th other gentlemen of the committee are right, with one exception; that is in the manner of doing extra work. The report recommends that all extra work should be done by extra men.

Mr. Doyle—I mentioned either extra men or foremen.

Mr. McInarna—My experience has been with all extra work, that it should be done by regular section foremen who are competent to do it. And one reason is, in this way you will find about the only manner you have of educating your section foremen. If they do not have practical knowledge of the work, they have no other means of gaining that knowledge, and for that reason I think it is better to let the regular section foreman do all the extra work, as ballasting, track-laying, putting in frogs, switches, etc., with careful extra men in the Northern and also in the Southern States, although I did not wish to interfere with that point.

The President—You signed the report?

Mr. McInarna—Yes, sir, I signed the report.

The President—And you object to that provision?

Mr. McInarna—I wish more men. [A voice, "More men."]

Mr. Jordan—I understood from that report that it included nothing but sectional labor, and work such as laying llasting, that this should be done by extra

scy—(Reading.) I would offer as an amend-
report on "Track Labor," "That a section on
, gravel ballast, should have on an average four
seconded. Question.

dent—The next subject in order this afternoon
itomatic Switch Stands and the Protection of
ts."

rt Black—Mr. Chairman, I find that several of
ee are not here.

dent—We will take up the report offered by the
the committee present, and the Association will
it.

—This being the first year of this committee,
r not brought to the attention of the Association
committee feel that it has done the best within

read the two reports of the committee, as fol-

it and Members of the Roadmasters' Association of America :

—Your Committee on Automatic Switch Stands respect-
e following report :

liest construction of railroads, it has been the aim and ob-
ho have had charge of such work to avail themselves of
at secures safety and comfort to their patrons and insures
the earning capacity of railways.

ıs regards every department of railroading ; but in none
hat particular and important department which we repre-

ments which have been made in the last few years are
nd are illustrated in the subject which is now presented
ssion.

of Automatic Switch Stands is one involving more of a
our committee had at first supposed possible. We find
t is something of an ancient one ; that there is evidence
switch stands were invented and patented in Germany as
2 and 1853. The records do not state whether these first
ut into practical use, but their existence indicates that the
a device was recognized even at that time, and that the
vere busy with the problem then.

The object was and is to devise a means of throwing a switch, whic in the event of inattention on the part of switchmen or brakemen- be tha caused by forgetfulness, overwork or sickness -would protect an ap proaching train, and so save the road the expense incurred by a wrec more or less severe, and from possible loss of life.

The next step taken to attain this result was putting a spring eith between the two points of a switch, as in what is known as the "Loren switch, or by attaching it to the moving rod having the spring interven between the stand and head-rod of the switch. The objections to the devices are so generally recognized that it is unnecessary to refer to the here. Suffice it to say, that where a spring intervenes between the poin of a switch and the target indicating the position of those points, t conditions are unsafe. The connection between the points and targ should be positive and allow no lost motion ; and it should be impossib to throw and lock a switch-stand so long as an obstacle of any nature r mains between the point and the main rail. Thus, these devices did n solve the problem of a rigid connection between switch and stand: positive motion when thrown by hand, yet automatic in action und the wheels of a passing train.

About ten years ago another attempt was made to solve this proble but the devices then presented were imperfect in some important spects, and it has only been within six or seven years that anything of practical nature has been invented, and we learn that there are at le ten automatic switch-stands now claiming public attention.

Your committee, realizing the importance of obtaining as wide an pression of opinion as possible concerning these different stands und the different conditions existing in remote parts of the country, ha made inquiries East, West and South on this subject ; and, after gath ing such information, have come to the conclusion that that pattern automatic stands now in use on most of the railroads in New Engla some time since adopted by the railroads of the Atlantic seaboard in t South, and recently adopted by most of the principal railroads of t Northwest, is best adapted in all respects to solve the problem present to us. Respectfully submitted.

R. BLACK,
G. E. CAIN,
W. H. STEARNS.

AUTOMATIC SWITCH AND PROTECTION OF FACING POINT SWITCHE

To the Roadmasters' Association of America:

Your committee would recommend that a detector bar be used for th purpose of preventing train men and others, while manipulating th switch, from throwing it between the two trucks of a car when passin in on the siding, or upon the main line while using the switch in chan ing cars from the main line to the siding, or *vice versa*, and that th

lation of the detector bar and lock and signal all to be thrown
ever and in one movement.
committee would further recommend that when switches are
with a three and a half or a four-inch movement, that a short
ail be used in front of the point and close to its end on the side
into the siding, to protect a loose wheel from taking the outside
oint while passing on the main track.
viate the use of the guard rail, and thus lessen the liability of in-
train men from being caught while in the performance of their
our committee would further recommend that the throw of a
itch should not be less than five inches.

R. BLACK,
G. E. CAIN,
W. H. STEARNS.

President— You have heard the reports, what do you
se doing with them?

McInarna moved, and it was seconded, that the re-
e accepted.

Courtney— Mr. Black, have you any particular style?
inquiry, I find the majority in use, and that give the
tisfaction, are the "Ramapo Switch Stands." I do not
mend any particular stand.

Black— That was the Lorenz switch, and concerning
rding of that, I will state that they were mentioned
request of Mr. Stearns, one of the committee.

Stearns— When advocating, in the first place, the use
guard rail on the side leading to the side track, you
te that is the point exposed, and the guard rail is in-
to protect it against any injury from trains passing
main track. To avoid the use of this guard rail, has
to some extent, considered desirable. Yet it would
o obviate the possibility of the flanges of a wheel be-
ught by the point. We have automatic switch stands
ith which we are not carried away.

Marvin— I do not see why it is not as important to
uard rails on both sides.

Stearns— The guard rail at the switch point is to pro-
e main line and not the side track, and is used solely
side track rail.

Preston—The point is, you advocate a guard rail on
ides.

Mr. Stearns—We are merely defending this 5-inch throw. It would be unnecessary to put a guard rail at the point of the switch. We remove the guard rail where the point of the switch is thrown five inches.

Mr. Ramsey—The report stated the switch throw should be five inches. Will one of the committee please give me some reason for that? Ours are four inches.

Mr. Marvin—As suggested by the gentleman, if the guard rail were necessary on the one side, it seems to me it would also be well to be on the other.

Mr. Black—The gentleman asked me a question a moment ago, in relation to why a 5-inch throw was necessary. It is for this reason: if you have a 5-inch throw, you will only require one guard rail for the main line, and there will be less danger of catching feet between the guard rail and the main rail. That should cause it to be given consideration.

Mr. Kindelan—I think with a 5-inch throw there will be no necessity for any guard. With that five inch, surely we can dispense with both. Then again, the objection to the side track guard rail is to be taken into consideration.

Mr. Marvin—It has been suggested many times that one object in making the throw five inches was to prevent the fastening of a man's foot. Now, should not the change be made to six inches? It would not be necessary to use it the whole length.

Mr. B. Murtaugh, N. J. Cent. R'y—I have used the point switches since 1875, and never used a guard rail with switch throw 3¾ inches.

The President—Any derailments?

Mr. Murtaugh—Never.

The President—Then you consider the guard rail unnecessary?

Mr. Murtaugh—Yes, sir.

The President—What is the length of your switch?

Mr. Murtaugh—Twenty feet, standard.

Mr Lindsley—Split switch?

Mr. Murtaugh—Yes, sir.

rna--What throw do you have?

ıgh—Three and three-fourths inches.

·na—Do any of your switches widen the gauge?

ıgh--Yes, sir.

rna--And does not that reduce the throw of

ıgh--Yes, sir. And we are running three or
ɜr trains a day, and never have an accident.

rna--I wish to say that I have had six auto-
ɜs in use, with 3½-inch throw, and it is a com-
ıce for a track to spread. It is a common oc-
hese switches, as well as on other parts of the
here it spreads a half inch, and would reduce
ɔ three inches, the wheel is apt to catch in the
:e the wrong track.

ıgh We use a switch throwing five inches.

rna- I wish to state to the convention, that I
opposed to anything in the shape of automatic
s. My reasons are, that when you adopt the
·le, the means of spring connection or anything
urpose of preventing the point of the rail from
s doing other damage to switches. You are
something to admit and excuse carelessness
en. I think it would be more beneficial to the
hey have the rigid connection, making a solid,
ion, and let the switch be so constructed that
ɔass through that switch unless it be turned by
:areless man comes through, let him suffer the
. That is far better than the plan of making
switch, with the instructions to see that it is
ıe shoulder of the rail before leaving the switch.
ow they are in a hurry, and it is one man in a
t will look at it, and the result may be that he
in that condition for some other train to run
se an accident.

- My opinion of the use of the automatic switch
:his includes the stand and spring; there are
ɜ in the country, and a large addition to this

would be apt to make men careless. With this particular stand, it is impossible to have the switch wrong. If the switch is set for the side and the train comes along on the main line, it will set it for the main line and leave it safe.

John Sloan– O., I. & W.– One way.

Mr. Black - Of course; but we will say that the train is making the station, one thing on the main line, and the switchman is waiting to set the switch. The train coming in on the main line will safely adjust the switch. If there is a train inside of the track you can put the responsibility on the engineers. If he left the switch wrong, the engineer would be dismissed. He must go by his signals; green light shows the side track, and he must wait until the switch is set for the main line.

Mr. Cram was at the last executive meeting, and the running of trains through this switch, as formerly, was examined.

L. C. Howes–Union Pacific–Mr. Black, speaking of the train coming down the main track; after the train had come out of the side track, that train coming on the main track sets the switch for the main track again. Well, now, is not the same automatic switch adjusted so that any time the switch will turn itself to the main track always? It can be adjusted so that it always can be turned to the main track, no matter how you leave it.

Mr. Black–No sir, it is only in case that the train is set for the side. If the switchman should fail, and the brakeman forget, the next train coming along, when the engineer runs by, he will run through the switch, and it will set itself for the line.

Mr. Howe–But it is arranged so that in other cases it will spring back to the main track?

Mr. Black–No, sir.

Mr. McInarna- Mr. Black, you said that it might be left wrong, and the train would run through it, the engineer failing to see the light. Can it be adjusted so that the engineers can see the light under all circumstances?

r. Black —That depends upon the headway he is mak- If he should run by, he does no damage to anything.

r. McInarna-- But he is going to damage that train; with to 7 degree curve, and at the distance from where the neer sees the light, he cannot bring his train to a stop ie rate of forty miles an hour.

r. Black—The collision of two trains is impossible, for eason that it is acting automatically. This is not in ase of the roadmasters, but as a protection to all road- ers, and especially to engineers. There is no question, u will look up the report of an accident on a railroad these switches, the first thing that will be charged will relessness in the man handling the switch. It is only heir protection that I bring this question up, that they reflect upon it.

. McInarna—I think the responsibility would rest on nanagement of the road that adopted and maintained switch.

r. Black—The committee has made its report, and I tried to explain it as intelligently as possible. I know there are 23,000 of these stands in use, and from infor- on I have received from roadmasters, they have been ably received.

r. Howe- Mr. Black, speaking of the Ramapo stand, does that apply?

r. Black That automatic stand applies to trains run- in the same direction to the turning point, considering unning of the trains both ways.

r. Ellis I have had the Snow automatic stands in use ast six years. I would like to ask one question. Will the Snow automatic stand, left wrong for the approach- train, so that the train, if it comes to the switch, will in on the side track, unless the switch is a defective ch?

r. Black—It will enter on the sidetrack.

r. Ellis- I will admit that the automatic stand, when a i is running against the point and the switch left wrong, permit the train to pass in on the side track, unless the switch is a defective switch. Now, then, if he has a rigid fixed stand, and the engineer runs through the switch and breaks those points, will it not have a record the same way? Or if a stub switch, the old family relic, will he not have a wreck if he comes against that switch, if wrong? My road is a little peculiar, being very crooked, and I use a guard rail at all facing-point switches. In some places I put a guard rail on each side; and, in connection with the same, would Mr. Murtaugh be pleased to answer, would you advise, where there is a split on the outside of the curve leading to the side track, that the guard rail be used?

Mr. Murtaugh—No, sir; I would not. What throw have you?

Mr. Ellis—A four-inch throw.

Mr. Marvin—Mr. President, these discussions all have reference, of course, to switch-stands used with split switches.

The President—Yes, sir, automatic stands.

Mr. Murtaugh—Is it proper to bring in for discussion stands used for any other switches?

The President—Yes, sir; the gentlemen are allowed to give their experience concerning the making-up of the different stands.

Mr. Murtaugh—I am using the stand on the road up which I am acting, which stand is called the "Wharto Stand." We use it entirely. The question occurred to m about leaving the switch set for the side track. Now, wi the Wharton switch, we use an automatic stand. That r quires a man to stand and hold it, and as soon as the m leaves the switch it falls to the main track, and it is impo sible to leave the switch set for the side tracks. Some s rious wrecks have been caused from a lack of discipline. think the adoption of the switch as a standard would not i clude this, but it seems that it is an important point that all main line switches, when the switchman is not there, th main line will be left clear, but I would only recommen them for main line switches.

Mr. Preston—The Wharton switch is not automatic, an can not be used with the automatic stand. It is not autoic, for the reason that it has to be set by some human ıcy.

r. Murtaugh—That which you have is shaped by the and the other by its style.

r. Preston I should like to ask whether the Wharton ch can be considered as automatic or not. If a train or ine pass out of the turn out, can it change the Wharton ch?

r. Murtaugh—It would not be necessary.

r. Preston—The reason for that is that it is so concted and arranged that safety comes and stays with it, passes through the "U rails" out on the safety casting, on it to the main line. Now the automatic switch is so that the rail must be switched to go on the main

r. Murtaugh—It is a dangerous device, I have said, on main line. If they run through and break it, a wreck be the result.

r. Preston—Then bring in the Wharton switch; yet it ld not seem to be exactly in order, as we are discussing vitch that will work in connection with the automatic d.

r. Murtaugh—Yes, I can show one that will work in con:ion with the split switch.

Ir. Lane There is a move here to try to do away with guard rail in front of the point. I commenced using n in 1888. To-day we have in use on the division where n, between five hundred and six hundred automatic ch stands to very few split switches. When we had our meeting, no automatic switch had been invented. We shed some of the Tracy switches the first moment pos-e. The drop lever switch stands in use, can not be beat his country or any other country, as they have never en short yet in one single instance. One point has been ight up against it, and that is a tricky one, and I think lefective. That is the fear of nervous switchmen beting confused while the train is passing over. This is not the stand we have here, but I think it will be of great benefit.

Mr. Courtney—I object. We are not discussing the automatic stand.

The President—They are joint reports. It says: "The Automatic Stand and Protection of Switch Joints."

Mr. Lane—I have a switch with a three-and-a-half throw. One on the main line yard I have never changed. They are made to throw three and three-fourths, but to account for the lost motion we can fix it to the rail, and not have to put a washer between the points and the rails.

Mr. Minor—We use two guard rails. I do not see that this is absolutely necessary. I do not condemn a road that does not put them on, but to my mind I do not wish to see a split switch fail, and especially in my case, as I wish to keep the two guard rails.

Discussion closed for the day.

Mr. Ellis—I would offer this resolution:

Resolved, That a committee of five be appointed by the chair to consider any modifications of the constitution and by-laws that may be desired.

Seconded and vote undecided.

The President—What is the motive of the resolution asked for? (After a brief discussion, the resolution was laid on the table.)

Mr. Ellis—I would say this, that both the constitution and by-laws can not be changed without a two-thirds vote of the members present at a regular meeting, but it came up casually on the motion of an application for membership of this Association, and those applying could not get the necessary number of votes. There may be some other matters to come before the house. They may be brought up for your action.

Mr. Courtney—There is your constitution and by-laws, and they must exist, too.

Mr. Ellis—As the gentleman has said: "There is your constitution and by-laws," but I think he will grant this, that the relations are changed between engineers and roadmasters. I left two engineers of maintenance of way. And there are some, the supervisor, for instance, who is a roadmaster under a different name. They are inspectors of track, and I have to my name "engineer." I am both on my short road. If this amendment is allowed, I should like to make further remarks.

The President—I think an amendment to our constitution and by-laws has to be made by a two-thirds vote. Therefore, it does not require undue haste on our part to stop the scheme. We can not be deceived.

Mr. J. W. Craig—In connection with this matter, it is a duty I do not wish to perform myself.

It was moved and seconded that the resolution be laid on the table. Carried unanimously.

Adjourned to meet at 10 to-morrow morning.

WEDNESDAY, September 11

Convention was called to order at 10 A. M.

The President When we adjourned last evening discussing the subject of "Automatic Switch Sta Protection of Switch Points." You are herewith as for business. Before proceeding, I should like t there are any members present who did not answe call yesterday morning?

[Voices, "Yes, sir."]

Please give your names to the Secretary - one a It is absolutely necessary to know each member's n is here, for reasons that will be stated further on.

A large list was taken and entered by the Secre others were entered during the session. The nam applicants for admission were read by the Secreta names called and answered to.

The President-- You have heard the names of tl cants. What is it your pleasure, as the Associati with them?

On motion, they were all admitted.

Mr. Burnett was called to the chair.

Mr. J. W. Craig - (President)--Mr. President an

bers of the Roadmasters' Association of America

commenting upon it, I will read it: "Mr. C. E.
ie Chicago, Burlington & Quincy, said to the
ter last evening: 'I see by the Denver papers
s some talk of re-electing the old officers by sus-
rules, but this will not be done. On the con-
iles will not be suspended, and we will fight for
mance. I have nothing against any of the pres-
They are all good men, and I was one of the
ged Mr. Craig for the position he now holds;
the supply men want him re-elected, they pro-
away with the constitution to accomplish that
Association, as an Association, can not afford to
atent right and supply men.'"

is the article as published, and before I have
ith this article, if the gentleman is present, I will
e is correctly reported?

—No, sir, not in full.

dent "This Association, as an Association, can
o be run by patent right and supply men."

The reporter said to me: "Are the supply
g the Association?" And that is the foundation
ught about the remark.

I ask Mr. Jones the question, did you make
or not: "This Association, as an Association,
rd to be run by patent right and supply men?"

The question is understood. Yes, sir.

"We have got to have a change or the organ-
be disorganized." I will ask the gentleman if
it remark or not?

—Not as reported.

Will you qualify it, sir?

No, sir. I do not think I made that remark.

I will also ask the gentleman another qnes-
esident. Were you reported correctly when you
ld not be re-elected because the supply men

s—No, sir. Mr. Craig, I have nothing to say
personally, at all. I spoke as I did as a general

whole. I am glad to say even this. You know, personally, that I have always treated you with respect.

Mr. Craig- This article does not apply to me alone, but to the Roadmasters' Association. I am now on the floor as one of the Association, and I bring this matter before you because every member of the Association is interested in it. [Applause.]

Mr. President and Members of the Association --I am not talking with any view of a re-election to the office of President of the Association. Here is the record of the Association since it was born. It will show that after my first term of office I desired to step down and out. It has been urged upon me, but I have refused. Within the limits of the Constitution and By-laws, I could not do otherwise than accept the position of President, politely. I have since, in my Presidential career, endeavored to serve you faithfully and accurately. Yes, I have tried to do it in every way I could. I must say that I did not wish to rest, but attend faithfully to duty and never tire; but when the imputation is against the presiding officer of the Roadmasters' Association of America, that he is run by the supply men, the climax is reached. If there is any member of the Association who wished to accept the hospitality of the supply men, that rests entirely and personally with them, and not with the Association. With the President, Secretary, First and Second Vice President, there must be a change. I have control only of that. I govern our personal actions within the sphere of our official duties. You can do as you may, and in return I desire certain privileges. If I am waited upon by two or three gentlemen with an invitation for an entertainment, I must know whether it is right to receive it. If it is right, if it is wrong, it should be so known by everybody. I do not feel that the Association have anything to do with my personal actions. "We must have a change, or the organization will be disorganized." What is the inference to be drawn here? A change in what? Does it apply to the change in officers in this Association? If the word has not been correct let some brother keep a more specific and watchful eye over it outside, as well as in the hall. [Applause.] Furthermore, gentlemen, if there are members of this Association doing anything that is not the proper thing, it is the province of the member of the Association, who wishes to inform, to come to the President or Vice President and have a session. Let us settle the many differences, and do not let it go to the world that the Association is doing wrong. The Association's doings do not stop here. Impressions will be formed by those articles read here. I have made these remarks individually, for myself, as well as collectively for the Association. I could not leave the city of Denver without thus informing you, and further, I have nothing to say.

Mr. Jones—Yes, sir. (Reading.) "The officers of the Association, as an organization, can not afford to be run by patent right and supply men." Why the supply men? We have got to have a change. I do not say that the organization will be disorganized. I did not say "I think there should be a change in the election of officers." I did say that James Sloan would be a candidate and be elected. I had some talk with the reporter, but not to this extent, and with all due respect to the members of the Association.

Mr. Craig—There was one more thing I desired to say. As far as the supply agents are concerned, I will state for the benefit of the Association, that there is not one who has ever approached me and wished me to purchase what they sold. Furthermore, I have never purchased one nickel's worth of them. We have a supply department of our own, separate, to which these matters are assigned. We can only use what little influence we have; not recommend. In the article it is indicated that I was run by the supply men. I have never been approached by any of these supply men, and I never purchased a cent's worth of any of them. So far as the remark is concerned regarding the amending of the By-laws, a resolution was offered yesterday and tabled. There is a law that it must pass by a two-thirds vote. You must know the trouble that the committee have in changing the Constitution, and yet it is thought that these By-laws and the Constitution can be changed in a few moments unless there is a watchful eye.

Mr. Lindsley—As a representative of the C., B. & Q. road, I regret very much that differences should arise among members of the Association. I will say in regard to Mr. Craig that I have been a member of this organization ever since its foundation, and I think during Mr. Craig's career as commander of this organization he has brought this organization to a standard, which no other member belonging to this Association would be capable of doing. [Applause.] In regard to these supply men, they are not allowed to bring their things inside of our hall.

Mr. Ellis—I joined this Association one year ago, and from being Secretary of the New England Association, it has all added a great deal to my work. I came here with the delegation from New England, and we have accepted of the courtesies from those supply men, and I do not think there is one in the party who would not accept those courtesies, only as men and fellow-citizens, and we have manhood enough on our road not to advocate any device unless we see merit in the same.

In regard to the supply men I make this claim. Unless we meet them hand in hand, with free intercourse in the examination of new inventions, we certainly make a mistake. It is the only way we can see the devices and inventions all together, which is of immense advantage to all. We can not purchase, but being allowed full examination of the things which most interest us, we gain knowledge in favor of our roads.

Mr. Reed (Secretary)—I wish to place myself, personally, on record regarding this matter, and we wish to deny emphatically the assertion contained in that interview, which was most pernicious. We have found nothing but good in the presence of these supply men. In this connection I wish to say that I have not, by any word or insinuation, been approached to purchase a cent's worth of these men. As Secretary and Treasurer of this Association I will defy any man to say that I have said one word, that I have cast

e intimation that I should like a continuance in this of-
e. It is no *sinecure*, I assure you. If it is thought to be
office of emolument and no labor of account, let the gen-
man who thus thinks come with me and look at my books
d papers for a few moments only. I will say that I have
rked steadily, earnestly and faithfully for this Association,
d no man will say otherwise. I also desire to express my
grets that a member of this Association should have ap-
oached this matter in this manner. The proper place for
lding interviews, regarding our Association, is in conven-
n assembled in this hall, and not in our public prints, and
this regard I wish to place myself on record. [Applause.]
r. Burnett—(President Craig resuming the chair.)—I
ly regret that a member of this Association should state
newspaper reporter that the Association was being run
he railway supply men, and that with their assistance
present officers were attempting to manipulate the By-
so that they would be re-elected. To make such a
d insinuation should call to his cheek the blush of
ne.
was the first President of this Association. The Asso-
ion was organized by myself and three other gentlemen,
of them now present. We worked together for three
rs, and during that time no discord ever arose, everybody
sant and happy, and nothing known to the outside world
the good we endeavored to accomplish. At our Chica-
meeting, in 1884, Mr. Craig being absent, I urged the im-
tance of his election as first Vice-President, and why?
resided in the South, and we wanted Southern members,
knowing Mr. Craig as I did, I knew of no man who
uld do so well for the Association as he. You will note
t it was in his absence that he was elected First Vice-
esident of this Association. Mr. Coleman, of the Santa
road, had occupied the position before that time, and his
iends wished him to hold it, when he said those words to
e reporter that he would rather not have it, but, instead,
at we should secure a man who would draw representa-
ives from the South. Mr. J. W. Craig, of Charleston, S. C.,

was then elected First Vice-President of the Associatio and in St. Louis in 1886. He has worked hard, honorabl and faithfully for us ever since. I think Mr. Jones had "th bee in his bonnet" when he said those words to the reporte

I was elected First Vice-President of the Association i 1886, and was elected after serving as President three year also now, three years as First Vice-President. Surely, y will admit that I have served my time.

I received a letter in July last from Mr. Craig, saying th he could not accept the position of President of the Asso ation again, even if tendered him, and urging me to agree assume it if the members saw fit to elect me. I said I cou not possibly do it, and that I would not serve again as officer of the Association in any capacity. We interchang several letters in regard to the matter, and in every one insisted that he could not serve again and would not; th it was not right that the head of the Association should r main with him; his ambition had been satisfied; that t head of the Association had been in the South three yea and must now be given to the North. And now for a me ber of this Association to say that the present officers h conspired with the manufacturers to suspend the rules a keep them in their present position, is absolutely ridiculo and absurd, as well as being unfair.

Now, as far as these gentlemen are concerned, the man facturers are right jolly, good fellows, every one of the [Applause.] Look at James B. Braddy, Chairman of t Supply Agents' Committee, and a hustler. They are a goo whole-souled, honorable set of men. [Applause.] H kindness is only excelled by the rail-saw switch he rep sents. [Laughter.] It is true we have received hospita ties at the hands of these gentlemen, and not from the alone, but from those whom they represent. The mon does not come out of their pockets, directly. Who w state that the Association has ever received from these ge tlemen in any way, shape or form, any solicitation, or h been urged to favor any particular device? If there is on let him stand up. [No response.]

I do not think the representatives of the manufacturers have ever asked any favors. Now, for instance, take nut-ock manufacturers; they have several representatives here o-day, and I do not think that one of them has ever asked member of the Association to purchase his particular de-ice, be it nut-lock or what. They certainly have not, to my knowledge, and yet, if I took an interest in any particular kind of nut-lock, and wished to recommend its use, I hould certainly do so.

The families of our members have been kindly, and I may dd, right royally treated at all times by the supply agents, during our deliberations at the convention here assembled, when otherwise they might have been sitting in the hotel, unless there were some nice young men as those to chaperon them around to points of interest. [Applause.] They have had carriage rides and been drawn everywhere over this beautiful city, and learned of its great interests, through the politeness of this Supply Agents' Committee.

Now, if there are any members of this Association who do not wish to receive these courtesies, they are not obliged to accept them. [Applause.] [Cries of "Good!" "Good!"] But please understand, I will never refuse one of them. [Applause and laughter, "Good!" etc.]

Mr. Lindsley—It must not be forgotten that Mr. Burnett and myself are two of the founders of the Association. We are two of the pillars.

Mr. Burnett—Yes, sir. Mr. Lindsley and myself sat alone in the hotel in Chicago, waiting for one or two other men to make their appearance.

The President—We will now resume the discussion of the subject we have under consideration.

Mr. Ellis—There are automatic stands that can be regulated, so as to set the switch always. With reference to the Brant patent of the Jersey City Iron Works, which, no matter what trains pass it last, the switch is set for the main line traffic.

We have spoken of the Ramapo automatic joint, and I give the preference to it, from its positive connection.

When the handle of the same is thrown down, without the use of the switch, the switch rail is against the side of the shoulder rail, so that no other wheel can take the other side of the same. There are automatic switch stands giving good satisfaction.

We have another thing in the East, called the "Bryant," used on the Old Colony system. We also have the "West." The "Tracy" has been in use, and I have given it preference to the "Snow" and "Ramapo" improvement, and until I find reasons for it, of course I cannot change my opinion.

Mr. Lindsley—What is the name of the switch preferred?

Mr. Ellis—It is called either the "Snow" or the "Ramapo."

Mr. S. H. Brown—C. & N. W. R'y—I should like to ask the gentleman the name of the automatic switch which can be worked either way? Such a switch could be worked in the snowy season. It would work with the train running out at a good rate of speed to the side track, either if there was snow or a train in the way.

Mr. Ellis—In answer to that question, I would state that the point of the switch with the grand stand does good work every time, and the wheel of the truck goes through the same, so that unless snowing very fast, there would not be a very great accumulation of the snow. But I will admit that there is one objection to putting it into use: on my road we have one hundred snowy days in the year. The middle section is with ice, and the lower section rainy in winter.

Mr. Lane—There is a little misunderstanding regarding the automatic switch. I do not understand that the "Snow" and the "Ramapo," or "Brown's," or any other switch, is intended to run through after the turning out of a train. How would it throw itself to the point?

Mr. Brown—I do not understand that it is the Ramapo that we are expecting to run through to root the stand or break the switch, but the gentleman asked how it would throw itself right to the point. With snow, a foot or two, how safely, under these conditions, would the automatic switch work? The Ramapo, or any other automatic, of

se, reduces the chances, which is the endeavor of all
e switches.

r. Stearns—C. & N. W. R'y—There is a misunderstand-
apparently. Some have the idea that the automatic
ch stand is safe for trains going in either direction. I
ot think the questions in connection with the automatic
ch have been rightly discussed. I think our report was
over the case of a trainman leaving the switch wrong,
a train coming from the other direction. Would this
ch be thrown for that train to pass over with safety?
gentleman yesterday made the remark, "Suppose a
was coming along and we find the switch set for
side track." Now, I think that a better condition than
he train to run on to one of those switch points, finding
point a half inch or inch from the rail, and consequent-
ave the whole train thrown on the side track or main
k.

r. Wynn S. B. Co.—The Ramapo automatic switch has
thoroughly discussed here and hauled over. I would
as my predecessor has said, that there are a great many
r automatic switch stands in the market, as well as the
apo. About eighteen months ago Mr. Elliott, of the
ott Frog & Switch Co., of East St. Louis, Ill., con-
ed that he would try and make an automatic stand. As
ve been dealing with him for the last twelve years, he
t on to one of my switches in the yard. Now, this is the
experience I have had with the automatic switch stand.
ve seen the Ramapo switch, and seen it work to satisfac-

ow, this stand is placed right at the end of our yard in
St. Louis. Whenever our switchmen run through it,
ne concerns himself, and it is left alone. It gave per-
satisfaction with us. Coming out of the side track they
r attempt to throw it, and *vice versa*, and it has an-
ed all requirements. It has never been out of order in
time. Now, that is all I have to say on the subject of
matic stands. Of course, I would like to hear the ex-
ence of others. My idea is to get every man's views;

old men who have had experience, particularly, and we would receive a word from young men. I think the scheme would be interesting.

Now, I wish to say a few words regarding the guard rail approaching the split switch. In my opinion, I do not think it is really necessary to have any guard rail on a straight track. In my yards and we are right in the city of St. Louis, and my road runs around the corners, pretty sharply too they commence with a 12-dgree curve and run as hig as 35. Now, there is where I say it is absolutely ne essary to have a guard rail. I have found it so; a moreover, I have found that the outside point, running a 35-degree curve or so, needed a special point. Ours a made as follows:

The main track point is fifteen feet long, and the outsi point is sixteen feet long, being connected in the usual wa About nine inches from the end of the short point t twelve inches we add to the point extends further up, a so we get advantage of our guard rail. If you have t points exactly opposite, the guard rails will not answer th purpose. The flange of the wheel will strike the outsi point very hard, and will take a little piece out of the probably the first train passing. Now, then, the long poi is so far ahead of the short point that the guard rail prote it. If the guard rail was right at that point our engin which all run one way, would soon get a sharp flange, a they are bad enough as it is.

Mr. C. H. Cornell C., M. & St. P. I move to allow ea member five minutes at a time in argument of this matt for the first time, and the second time two minutes, or answer questions as long as the chair may see fit.

Mr. Brown N. W. I would like to ask the gentlem how much throw he said he needed to the split switch?

Mr. Wynn A five-inch throw.

Mr. Meade A., T. & S. F. He says they have 35-degr curves. How can you run your road engines around th or is it confined to switch engines?

Mr. Wynn — Occasionally they run the road engines und.

Mr. Meade A road engine, you are all aware, is keyed tight, and is not supposed to run around such curves.

Mr. Wynn– Yes, sir.

Mr. Lane Have you a guard rail around it?

Mr. Wynn—None at all. Of course, we must know, prac- ally, the movements, the running around of the engin- s, etc.

Mr. Davis--C. B., R. & N. How much spread of gauge e you?

Mr. Wynn—Four feet eight and a half inches to four feet e inches. Around those heavy curves we allow that. It ell braced and made secure.

Mr. Patch - Conn. R. R.—There seem to be a number of nts brought up here in relation to the automatic switch,

There are a number of roads in the East where they e an appliance they call a "Dog House" in connection these switches. The switchman or the brakeman must the door, go inside and close the door of this building re he can throw the switch for the turn-out; he can hrow the switch while the door is open, and he can not the "Dog House" until he has placed the switch back e main track. Would he not be in an awkward posi- f the switch should break? [Laughter.]

Jordan M. C. R. R. It seems to me that the mem- re getting away from the subject. I do not see what Houses," or the throwing of switches, has to do with atic switches. Any statements can be safely made.

Lane In explanation of the "Dog House" I will at on every switch on the N. Y. & N. H. road the House" is placed over the switch stand, and as Mr. has said the switchman must pass into the house and se the door. Then set the switch for the side track, e cannot go away until he throws the switch back for ain track, after which he can reverse the door and step

The split-switch is located on the main line, so that rdinary blow would shift it.

"Dog House" over the stand?

Mr. Lane—They are supposed to have men en there are three at the crossing, and during the turn men are supposed to be ready.

Mr. C. E. Marvin—I think we are discussing the the committee recommending the use of the gua front of the split switch. I offer an amendment t port to the effect that we have two guard rails.

The President—Please reduce to writing.

Mr. C. E. Marvin—To "amend the report of the tee, and substitute two guard rails in front of the stead of one."

The President—Will the Chairman accept tha ment?

Mr. Black—I will accept it.

Mr. Shepard (B. & M.)—I have the following i which I would be glad if the Secretary would read.

The Secretary read as follows:

"Mr. President and Gentlemen of the Convention—I do n leaving this convention without offering protest against the u rails at facing points and split switches. The road on which ing is something over 1,000 miles long in Nebraska and Col our main-line switches are split switches. They were inven we call roo; that is what connects the points at the ends. The of the switch stands is in the lever, and, besides this advantage, the can not be removed until the switch is locked for one way or the r. The points have four inches throw, with a capacity of five inches. lever is so arranged that should there be a spread of half an inch switch would still close up in a perfect manner. We have these ches in use here in Denver, and I will be happy to show any of the tlemen just how they work, if they will take five minutes' walk with after the adjournment of this meeting. I think they are next to a ect automatic switch. However, these switches rest on their merit."

r. Doyle—I call for the question.

he President—You have all heard the report of the committee read and amended by Mr. Marvin, of the Geo. Cent. R. All in favor of adopting the report will say "Aye." against adopting it will say "No."

shall have to decide that the "ayes" have it, unless there decided call for the "ayes" and "noes." The vote was up and the report adopted. The "ayes" and "noes" g divided, as follows:

dman, E. A.	U. P. R. R	Nay.
k, T. J	D. S. P. & P. R. R	Yea.
ett, I.	Ill. Steel Works	Nay.
rey, R	Lehigh Valley	Nay.
G. E	W. St. L. & P	Nay.
tney, W. H	L. S. & M. S	Yea.
g, J. W	C. & S	Yea.
pen, J. H	C. M. & St. P	Yea.
son, J. B.	Penna. Co	Yea.
le, John	D. L. & N	Yea.
land, A. N	A. C. Line	Yea.
ney, John	Mo. Pac	Yea.
rneau, F. X	C. L. & W	Yea.
y, N. A.	C. B. & Q	Nay.
over, H. D.	O. & M	Nay.
kins, A. M	Norfolk Sou	Nay.
key, Timothy	M. C. R. R	Yea.
lebrant, J. D.	A. T. & S. F	Nay.
es, C. E	C. B. & Q	Yea.
lan, O. F	M. C. R. R	Yea.
ler, L. L	Tex. Pac	Yea.
rwin, J. A	C. & N. W	Yea.
delan, J	C. M. & St. P	Yea.
tell, E. R	C. & N. W	Yea.

indsley, T. H	C. B. & Q	Nay.
Mandeville, J. O	Lehigh Valley	Yea.
McEniry, Chas.	B. C. R. & N	Yea.
McEntaffer, D	W. & L. E	Yea.
McInarna, M. J	N. Y. P. & O	Yea.
McQueston, J. C	C. I. St. L. & C	Nay.
Mullane, R. D	C. S	Yea.
Nolan, P	No. & F	Yea.
O'Boyle, J	D. & R. G	Yea.
Palmer, Martin	F. C. R. R. Co	Yea.
Payne, W. T	C. St. P. M. & O	Yea.
Preston, J. H	C. R. I. & P	Yea.
Purcell, M	J. M. & I	Nay.
Ramsey, John P	C. H. & I. R. R	Yea.
Reed, H. W	S. F. & W	Yea.
Ross, Donald	D. G. H. & M	Yea.
Ryan, J. C	U. P	Yea.
Schofield, John	T. H. & I. R. R	Yea.
Scott, J. W	N. M. & M. V. Co	Yea.
Shea, M	C. N. O. & T. P	Yea.
Sheehan, D	C. I. Ry	Yea.
Shine, Daniel, jr	W. N. Y. & P	Yea.
Sloan, John	I. B. & W	Yea.
Sloan, James	C. & E. I	Yea.
Smith, J. C	C. K. & N	Yea.
Stimson, W. B	G. R. & I	Nay.
Stockwell, C. H	C. M. & St. P	Yea.
Swart, E. F	S. C. Div. P. & N. Y. C	Yea.
Wright, John W	C. & N. W	Nay.
Ayer, G. E	A. T. & S. F	Yea.
Black, Robt	M. E	Nay.
Dobbins, P	D. & S. P	Yea
Ellis, W. F	N. Y. P. & B	Na
Geddes, J. K	B. L. & C	Ye
Howes, L. C	U. P	N
McGregor, A	U. P	Y
Mullen, T. J	C. M. & St. P	Y
Patch, J. R	Conn. River	
Ratliff, W. R	S. F. & W	
Rockhold, J. C	A. T. & S. F	
Stearns, W. H	C. & N. W	
Supplee, J	Penna	
Teller, C. B	A. T. & S. F	
McKenzie, L. W	Wichita & West	
Woodard, J. M	A. T. & S. F	
Wallace, J. H		

m, H. B		Yea.
r, A. S		Nay.
g, J. M		Nay.
am, C		Yea.
n, W. G		Yea.
p, W. B	C. B. & Q	Nay.
ghs, B. M	S. C. & P	Yea.
, J. M	A. T. & S. F	Nay.
ty, T. S	A. T. & S. F	Nay.
W. G	U. P	Yea.
, John	St. Louis Br. Co	Nay.
n. C. E	C. R. R. of Ga. & B. Co	Nay.
n, W. T	St. L. N. & W	Yea.
F. C	Housatonic	Yea.
s, J. W	N. L. & N	Nay.
, G. W	Fitchburg	Nay.
rna, J. W	"	Nay.
on, D. C	S. L. & N	Yea.
W. E	Vermont V. & S. Co	Yea.
J. S	N. Y. N. H. & H	Yea.
tt, G. E	" "	Yea.
inson, Wm	Boston & Maine	Yea.

e President We have now the report on "Standard s," which the Secretary will read for the information of ssociation.

e Secretary -The report is made from the North Amer- Railroad Superintendents' report.

e President—The report was sent to all members of the ciation, that the report of the Committee could not at nt have action taken on it, together with cuts. I pre- you have gone over this carefully. You have had nine hs to do it in, and if you have given the matter the at- n it required, you should understand it.

e Secretary read:

Roadmasters' Association of America:

r Committee appointed to report upon the subject of "Standard " beg leave to submit the following:

t we concur in the recommendations of the Superintendents' Asso- on the following points, viz.: As to the durability of the spring ver the stiff rail, in the preference of the riveted frog over any pattern that we now know of. In the recommendation of sufficient of heel to admit splices without any, or the least possible, cutting.

In the lengths for the distance from heel to point, excepting Nos. 9 and 12. To prevent frogs of a different angle being the same length, we would recommend No. 9, 8½ft., instead of 8ft.; and No. 12, 10½ft., instead of 10ft. In that the guard rail distance, or width of channel, or throat of frog, be not less than 1¾ inches, and not more than two inches. And in that the gauge should be exact at all points of the frog, except where the point is beveled.

P. NOLAN, Chairman.
R. CAFFREY,
T. HICKEY,
O. F. JORDAN,
J. H. PRESTON,
A. B. ADAMS,
C. H. CORNELL.

The President—You have heard the report of the Committee, what is it your pleasure to do with it?

On motion, the report was adopted.

Mr. C. E. Marvin—I have heard the expression from the gentlemen of the Association, who have had experience with spring rail frogs of the best patterns, in regard to the best plan adopted to prevent the spring rail frog from creeping ahead. I have had much trouble with those frogs. They cramp and refuse to spring back to their proper place.

The President—Is there any gentleman present to answer Mr. Marvin on that question?

Mr. McInarna—I have used the spring rail frog for fifteen years, and I have had no trouble with the spring rail creeping ahead. Of course, it will creep the same as any other track, if not prevented. The angle splice is used at every joint, which prevents the rails from creeping, and where the rails are so fastened, I have had no trouble with the frog. I prefer the spring rail frog to any other for the main track, and a rigid frog for the yards and side track. Should any of you come on the road where I have charge, I would be pleased to show this frog, and I am going on the road where years ago I acted. We adopted the spring rail frog, and have been using it ever since. It will wear out at least four rigid frogs. We keep up to the times and get all the improvements on it. The frog we are using now is fifteen feet long, the point being seven and one-half feet from the end.

Mr. Marvin—Are you engaged on single or double track?

Mr. McInarna—On single track, although I do not think t makes any difference.

Mr. Lane—I think my brother will find a great difference.

Mr. McInarna—A difference in the running of the rail, ossibly, but I have grades of sixty-eight feet per mile.

Mr. Marvin—A question, please. You have the style of spiking, of course, to prevent the track from creeping. Is there not an objection to that? Does it not cramp the frogs?

Mr. McInarna—Not to do harm. We have track walkers over the road twice a day, and they can see whether the spring rail is closing or not. We use all split switches and spring rail frogs.

Mr. Cornell—I believe the five minutes is up.

Mr. Ramsey—The best device I have seen for preventing he spring rail frog from being bound by the point is that n use by the Pennsylvania Steel Co., in the manufacture of heir frog. It is in the form of an elbow. The short end is ttached to the wing, and the long end is fixed firmly to the ed plate, which gives a firm connection between the wing ail and the frog point, making a continuous connection between the frog point and the switch point.

The reason of the creeping of the wing rail out of position, is not the expansion of the rails between the frog and the switch, but of the rails behind the frog. On the C., H. & D. we have been somewhat bothered by the steel being laid too tight behind the frogs, which is remedied by putting in a shorter rail.

Mr. Doyle—We have switches on a 212-foot grade. We have not had any creeping, nor had to cut the rail. The engine pulls up the hill all the time. We claim that if the management would allow us to do as we wish with the steel, and at the proper time of year, they would have no creeping of rails.

Mr. Caffrey—I am a member of the Committee on Standard Frogs, and wish to make some explanation as to my position in this matter. This is a report of standard frogs, yet it does not say anything about the construction of the frog, particularly. It refers both to the stiff and spring rail frogs, but it does not say how they shall be made or which shall be preferred. The principal object of this report is to give dimensions. Now, the dimensions are given in the report of last year. I notice that the press are discussing the merits and demerits of the spring rail frog, which I do not think was intended. But what I think the Association has to pass upon, in relation to this report, is simply the dimensions of the frogs as shown in the last year's report, and referred to in the report of the committee for the present year.

Calls of Question. The report was adopted unanimously.

The President—We will not take up the other subjects, as it is time for recess. We have some communications here which the Secretary will read, and we will act upon them as soon as possible. It will only take a few minutes to do it.

The Secretary The Chairman on "Track Tools and Implements" is not here to report, and I will read the explanation why:

EDWARDSVILLE, Ill., Sept. 7th, 1889.

To the President and Members of the Roadmasters' Association of America:

GENTLEMEN I regret very much that my work is in such a shape that I cannot meet with you this year, but such is the case. As to the report of the Committee on Track Tools and Implements of Maintenance of Way, I have not had the time to devote to this subject, and will have to ask your indulgence and the other members of the committee. As Col. J. M. Jackson is second on that committee, I wrote him some time since to prepare a report, and to call the committee together as soon as possible after reaching Denver for its discussion prior to its submission to the Convention. As he is one of the oldest and ablest Roadmasters in America, and all the other members are very able men, I feel confident this subject will be submitted in a far better manner than if done under the guidance of your humble servant.

Gentlemen, hoping that you will have the most profitable meeting this year of any in our history, and that all will enjoy themselves, I remain

Your obedient servant,

(Signed) P. L. SWINNEY.

The Secretary read the following letter also:

DENVER, Col., Sept. 11th, 1889.

To the President and Roadmasters' Association of America:

We hereby tender you and the Roadmasters now in Convention here in Denver an invitation to attend an exhibition of the Leslie rotary steam snow shovel, at the Union Depot in this city, at your earliest convenience. We would like you to appoint an hour when you can attend, as it is our desire to make a large photographic group of all the members of the Association who may be present.

Yours very truly,

THE LESLIE ROTARY STEAM SHOVEL CO.,
Per R. Pink, in charge of machines.

The Secretary—There is another matter in connection with this, and that is hand cars. The steam hand cars are now at the Union Depot for inspection and trial.

The President—What is your pleasure regarding the rotary plow, hand cars, etc.?

Mr. Caffrey—I would suggest that we attend to the business of the Association before accepting invitations to visit.

The President—We wish to notify them whether we will accept it or not. It is moved that the invitation will be accepted, and the time set for immediately after adjournment, and the Secretary is directed to so inform Mr. Pink.

Afternoon Session.

WEDNESDAY, September 12, 1889.

The convention was called to order at 2 o'clock.

The President—Members who have not given in their names will please do so at once.

The applicants for membership were named, voted upon and admitted.

The President—The next business in order, and which was recommitted yesterday, is the report of the "Committee on Standard Track Joints," Mr. Caffrey Chairman.

Mr. Caffrey—After looking over the resolution presented yesterday, we do not see wherein we can change our former report. We, therefore, return it to you with detailed drawings of the suspended joint, the same as referred to in our report at this convention.

STANDARD TRACK JOINTS.

Mr. President—Your committee, after looking over the resolution presented at the meeting yesterday, referring back to us our report, are unable to see wherein we can change our former report.

We, therefore, return it to you with detailed drawings of a suspended joint, the same as referred to in our report.

For a three-tie joint, we are of the opinion that the details presented by the majority report at the Washington meeting, fully cover the requirements, except the supporting plate, which we consider worthy of trial: said plate to be of sufficient length to cover the face of three ties.

R. CAFFREY,
P. NOLAN,
H. D. HANOVER,
E. J. DORSEY,
P. MCKEON.

Mr. Bishop—Mr. Adams, another member of the committee, has not reported yet. Mr. Hickey refuses to sign the

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for the reason of the plates attached. There seems
n inclination to place the splice on three ties.

President -I will state, for the benefit of the Chair-
iat we want a report from the majority of the com-
Those in the minority can only have their names
as dissenting from the report of the committee.

Burnett -I move that this report be accepted for dis-
and the committee discharged.

nded and carried.

drawings were carefully examined by members.

President - I will call your attention to this portion
eport of the committee, calling for a three-tie joint.
of the opinion that the paper presented by the ma-
eport, at the Washington meeting, fully covered the
ments. The details are all in point. Now, gentle-
you wish any discussion on this subject, the sooner
t at it the better. If the report is not in order, say
n it is not.

Burnett—In order to start the argument, I move that
port of the committee be accepted as the sense of
sociation. Seconded.

President—It is now open for discussion.

Sweeney—I am an advocate of the long angle bar and
pended joint, but I do not believe that it is absolutely
ry to extend the plate across the three ties. It has
d to me, in thinking this matter over long before
iat a very efficient arrangement could be had by per-
the rail to rest on the shoulder of the tie, something
surface of the plate. I notice on the suspended
iat the ends of the rails are being driven downward,
n the upper edge of the splice, under the stress of
ws, and in the course of time, I have seen the plates
ng line of road cut down one-eighth of an inch or
Another reason is, it takes less men. I do not be-
n the suspended joint. I believe in having a firm sup-
der the base of the rail, even with the three-tie joint,
o not consider this necessary to sustain it on the cen-
he tie.

Mr. Lane—The last gentleman speaks of the plates wea ing down. I am troubled with the same thing, and badly, too, and would like to ask him if the getting in that con tion was not caused by those joints being neglected in t first place?

Mr. Sweeney—No, sir. They were all cared for.

Mr. Lane—If kept tight, how can they work down?

Mr. Sweeney—With me they wear and settle, nevert less.

Mr. Lane—Mine were neglected.

Mr. Sweeney—I will add that they use the Sampson b right here on the Rio Grande road.

Mr. Burnett—Do you give the angle bar sufficient help resist it?

Mr. Sweeney—No, sir. If the center of the tie was we supported and something solid on top of the joint-tie take the stress off the principal edge of the angle bars, might be different. In the case to which I refer, we h the rail "hung up by the cars," so to speak, and I am favor of having it solid instead of being placed on bevel edges, and arrangements should be made not to tear t joint fastenings loose from the bolts.

The President—Mr. Craig—Mr. Burnett in the chair—F the proper understanding of the discussion of this subje I will state that you all know, at the Washington meeti last year, there was a minority and a majority report. Th were returned to the committee to report at this meetin The committee reports at this meeting with a majority a one member dissenting. Therefore, we have only the r port of the committee before us. If you will observe thi you will have the majority report of the Washington mee ing, with the angle bars as shown here. The time for di cussion is nearly exhausted. We should be glad to he from members. The committee has done away with th three ties under the joint, and has taken up the minority re port, so far as it relates to the ties and the length of th angle bars, and the only thing they have done is to place plate under the joint. Now, this is the report we are actin upon. The Association is to decide whether they will have the report of the majority, as shown at the Washington meeting, or the report of the committee at the Denver meeting.

Mr. Wynn—I do not believe in that part of the report of the committee, where it shows the distance from the end of the rail to the center on each side of the joint, making it a suspended joint.

The President—Please walk up to the desk and examine the print.

Mr. Wynn—I should be pleased to do so.

Many others did the same.

The President—This refers to the three-tie majority report, and the two of the minority—filled holes and everything. I will say I understand, at the Washington meeting and now, that to increase the support of the joint the tie was laid under the joint. You may wish to substitute a plate. It is a question for you to decide whether we will have a three-joint tie without a plate, or, on the other hand, the two-tie joint with or without a plate.

Mr. Nolan—The report of the committee did not dispense with the conditions of the three-tie joint, as shown in Washington. That was embraced in the report, as I understood it, and I would not have signed it if I had understood otherwise. I am as strongly in favor of the three-tie joint as when signed by me in Washington, yet I am in favor of giving the report a trial. I refer to the report here signed by Mr. Caffrey and others. I would embody the same features as regards the three-tie joint.

The President—Well, this is a part of the proceedings, but it shows only two ties under the joint; therefore, you will note the necessity for being prepared for three ties, for safety and an emergency, as you will note at the meeting in Washington.

A Voice—How many reports were there at Washington?

The President—There were two, one covering three joints and the other two.

any means. I understood that there was a prir up a sheet showing this suspended joint.

Mr. Caffrey I stated after reading this repc plate might extend across three ties, similar to t by the majority of the committee, at the Washi ing.

The President Then it is for the gentleme whether they will adopt the three-tie joint or tl

Mr. Burnett Mr. Craig resuming the chair— be as well, if they required two or three ties, tc at home, where they can be made for nothing, an to the Association?

The President Yes. It must be acted upoı sociation here, which will assist in making the the two or three joints.

Mr. McInarna—The question, from my st whether we shall use two or three ties with a no necessity for having a plate across three ties, plate is intended as a bridgeway between the ti

The President—That is it. Now you can what you are to decide upon.

Mr. Purcell There are those here who believ necessity for this plate.

rail. They weigh eighty pounds to the pair. We have them on about three miles of steel. When the discovery was made that they would not stand without breaking, we substituted for them an iron splice of the same length and bearing. With the iron splice we have had no trouble in breaking, as the majority of the committee well know. I was one of the committee declining to sign for the supporting plates, as I, myself, did not think them necessary. I am satisfied with the splice we are now using, and the position in which we have our ties. Now, here is the steel splice being broken in the center, broken as well as the rail with it, and I would consider that it was made of very poor material.

Mr. Wynn—The suspended joint was used many years ago in the country in which I was born, in England. I always advocated the suspended joint, but, as the years roll around, I advocated a tie under the joint. My idea is, that it was not properly taken into consideration, and I was criticized by the General Manager of the road. I loaded a car once, putting over 20,000 pounds of railroad iron on it. It was shipped, too. I was censured, but it went through all right. Now we have cars of 60,000 pounds capacity, and they are still increasing the capacity of the rolling stock. Still, they are slow to increase the weight of rail. You get a 60-pound rail in your track, and it is all right for nine or twelve months, but after the head begins to work the rail gets weak, and it is impossible for the section foremen to keep it in line. The rolling stock will spread it out, no matter how well protected by the guard-rail braces. And that is a thing I wish to bring before this convention the adoption of the heavier rail, and in addition, the extension of the base of the old rail. Now, I have always advocated a supported joint. I was glad when it was considered necessary to have a tie under the joint, and to keep it firmly connected with the joint. When the tie becomes loose and the joint is down, the splice bar is going to break. There is no advantage in having the long splice bar, if you allow the joint to get down. If *you* have a good track or a sufficient amount *of ballast to keep it* up in good surface, a short splice joint would be better than a long one. That is all, Mr. President, I have to say.

Mr. Shanks—Then will you get your strength by placing two ties there ten inches apart, with a plate crossing them of sufficient strength to hold the plate up, if you have not got that joint?

Mr. Wynn—I do not advocate that.

Mr. Burnett—In the chair—You certainly will. [Applause.] It is a substitute of this plate in place of the tie under the joint.

Mr. Wynn—That is a different thing.

Mr. J. W. Craig—Mr. Burnett in the chair—I offer the following resolution:

Resolved, That the majority report, accompanied with the print, as presented at the Washington meeting, be substituted for the report of the committee, except that no form of nut lock be shown.

My reason for offering the resolution is this: I do not think there is any question among the majority of the members of this Association, but that the three ties must be close together at the joint. There are various objections to all kinds of plates. First, they are expensive. Another thing in my mind: they may shorten the life of the rail. There are a large number of roads in the East, and I will say in the West, that have adopted three ties under the joint. I think there are some roads East with three ties under the joint.

Mr. Lane—We have none.

The resolution of Mr. Craig was seconded and carried.

Mr. Craig—I think this joint will be the coming joint. [Applause.]

Mr. Caffrey—Examining more particularly the remarks of Mr Hickey, in relation to the three-tie angle bar, which we have been discussing, and which, he says, is in use on his road, the Superintendents—all of them—are very much in favor of the three-tie joint.

It was in the beginning of summer, and some portions of the track had been gone over by the section men, though there were other sections of the track that had not been gone over since winter, nor reports made, where every single joint was down for miles and miles. There was a very visible depression of the ends of the rails for nearly every oint. Now we have a three-tie angle bar and a first-class road. It was then remarked to me that joints on that very road did not go down.

Mr. McInarna—What was the cause of their being low? Were many of the joints or ties neglected?

Mr. Caffrey—I am unable to say if they were, but I am led to believe that a three-tie angle bar, as suggested here now, is about right.

Mr. Kindelan—You said, Mr. Caffrey, that a part of this road was in a smooth condition, but the larger part had a number of low joints. Now, if the cause was not owing to the defects in the angle bar, then it must have been neglect in keeping up the track. Lately I have noticed first-class railroads with the joints down for miles and miles.

Mr. Caffrey—I will say for the information of the gentlemen that I am not talking from experience.

Mr. Kindelan—If you neglect a joint it will go down, and there is less attention required on a track with a plate across the ties, which would be a good supported joint.

Mr. Caffrey—I will say for the information of the gentlemen that I am not talking from my experience, but from what I have seen in relation to the three-tie angle bar.

Mr. Kindelan—I speak from experience and know. I have every tie put under the joint.

Mr. J. P. Ramsey—In speaking on the subject of the supported or suspended joint, I agree with the gentleman who spoke in Cleveland. He said. I will quote his words: "The rule I always used and advocated in laying track was, 'joint on tie' every time. When the angle plate came into use I changed to a suspended joint. I now admit I made a mistake. The angle splice should also have been laid 'joint on tie.'"

Mr. Doyle—I think it has been pretty well discussed. I would ask for the question.

Mr. Craig—Mr. Burnett, please take the chair. I would ask first, what was the committee's report at Washington? That ready, we still adhere to all the recommendations made at the Cleveland meeting in 1887.

Mr. Doyle—I would like to ask the Chairman if he considered six bolts unnecessary?

Mr. Craig—Why does he put in only four bolts at the Denver meeting and recommended six at the Cleveland meeting?

Mr. Caffrey—I would mention for the information of Mr. Craig that this joint was made up in addition to a suspended joint. As shown, it would seem better to me, personally. It seems that there were six bolts. I think, in my remarks, I said the position and the number of the bolts, yet the number I am not sure of.

Mr. Craig—If I understand the matter, that report has the recommendation of the committee. If adopted by this Association, then it can only apply to themselves.

Mr. Caffrey—I think, on this record, we had better ask that it be returned to the committee for details. There are no recommendations for these details. Let it be presented to the committee, and let there be presented one having four holes, one having six holes and one having the joint fast on three ties, and one on two ties.

Mr. Black—Do I rightly understand that it may be entirely removed, the question of the plate?

Mr. Craig—That is what the substitute says.

Mr. Courtney—As there seems to be a misunderstanding in regard to the real matter voted upon, I would like to offer this as an amendment to the substitute and for the substitute:

Resolved, That the long angle bar resting upon three ties—one tie to be placed under the center—makes the best joint known. The angle bar is to be of sufficient weight to resist the strains under all circumstances. Their length should be from thirty-six to forty-eight inches, being governed by the number of ties used per mile, making the ties the same distance from center to center that they may be under any part of the rail. The angle bar is to be fastened with four or six bolts and slotted for spikes at each end. They should be made of a good quality of steel.

r. Craig—I accept the amendment.

r. Burnett—You are, you understand, voting on the mo- that Mr. Courtney has just made.

ad by the Secretary and carried unanimously.

e President—We will now have the report on cattle ds and road-crossings. Mr. Doyle is Chairman.

EPORT OF COMMITTEE ON CATTLE GUARDS AND CROSSINGS.

he President and Gentlemen of the Roadmasters' Association of merica:

is now and always has been the desire of prudent and careful rail- managers to reduce in every possible manner the percentage of lia- to accidents, and consequent injury and damage to persons and erty, and the cattle guard has doubtless received its proportion of deration at their hands.

at the ordinary open or pit cattle guard, which is almost universally is a constant source of danger, is admitted by all, and the numer- ossibilities of accident from their use are so well known that it is ecessary for the committee to enumerate.

periments have been made with numerous devices to obviate the f the pit guard, but so far as known nothing was found to take their until the surface guard was produced. The Iron Surface Guards been placed on seventy or eighty roads, and so far as the commit- n learn they have given almost universal satisfaction.

committee considers this guard the best and safest one in exist- to-day, for the following reasons:

And most important, it does away with the opening in the track.

It will turn stock as effectually as the present pit guard.

It is more economical, because its original cost is less than the ard, and being made of iron and steel entirely, is many times more le.

It is easily removed from the track for the purpose of renewing r surfacing track.

Does away with the almost universal heaving of track at cattle by frost.

JOHN DOYLE,
G. E. CAIN,
I. BURNETT,
J. H. PRESTON.

ROAD-CROSSINGS.

e committee would recommend—

Planking between the rails from sixteen to thirty-two feet long, langeway 2½ inches, plank same height of the rail; also plank one utside the rail with uniform approaches.

2d. Lay guard rail inside of each main rail and fill between guard rails with broken stone, gravel or loam, and plank outside of the rail, and grade the same as on plank crossing.

John Doyle,
J. H. Preston,
G. E. Cain,
I. Burnett.

The President—You have heard the report, what do you propose doing with it?

On motion of Mr. Burnett, the report was received.

The President—The report is before you now, for discussion.

Mr. Meade—I should like an explanation in regard to the guard rail. I do not understand.

Mr. Doyle—Down in Michigan we do not use guard rails.

Mr. Preston—The report answers that question. Some of the Western States use them and fill in with gravel, or any ballast whatever. For the past four years I have been using them through cities. Now, gentlemen, that is the main track rail. (Showing rail.) Now, take a rail one-half inch higher than the lower rail, leaving three inches flange-way and putting a bolt through the head,– the outer side being the same way, filled in with stone—that does away with the plank. I used them for four or five years in cities, altogether, to save plank; and it saves a great deal in repairs.

Mr. McInarna—Was there a half-inch difference in the head of the rail on your road?

Mr. Preston—3½, 4 and 4½. Another thing is, no ice collects. You have no picking to do. We never used them outside of the cities or towns. The flangeway keeps it entirely clear. Mr. John Crippin is here, and has used them a number of years and knows something about them.

Mr. Meade—Would it not be well to set the guard rail on its base?

Mr. Preston—If you set your guard rail up on its base, you are apt to catch horses' feet, from the fact that a horse coming over there, if he has a long cork on his shoe, it is liable to throw him. I use those guard rails with the rails side by side, and that is the trouble. We have had several horses to pay for.

Mr. Kindelan—Do you round out the ends of your guard
ls, or do they remain the same?

Mr. Preston—With the top flange the guard rail sits on its
ge, and will turn. The flange of the rail is the same as
ntioned for the regular guard rail.

Mr. Patch—How do you fasten it down?

Mr. Preston—We have never had any trouble in fastening
own, from the simple fact that you bolt the guard rail to
main rail. That is, putting the bolt through the end of
guard rail and your main rail.

Mr. Patch—Have you got to drill through both of those
s to work in the bolts?

Mr. Preston—No, sir. We cut back four to six inches
n end of rail, through the flange and web, leaving the
l, and then drill through the ball and main rail, and then
t the end there, and then turn out the upper flange, so as
make it look like any other guard rail.

Mr. Wynn—You say that you fasten the guard rail at each
l ?

Mr. Preston—Yes, sir.

Mr. Wynn—Now, suppose your crossings in cites they
not the same as on your country roads, being sixty
t long—how do you fasten them?

Mr. Preston—We do the very same thing. Cut away the
ge and web where the joint is thick, and take one track
t and make the same bolt that holds the guard rail an-
r for the fish plate. We have but eight inches to con-
d with, leaving the flange right on and the other con-
cting all right.

Mr. Wynn—Then we have to connect at each end of a
irty-foot rail. Judging how little there is to hold it down,
e whole length of the thirty-foot rail is loose.

Mr. Preston—I never knew one to come up when laid on
e tie.

Mr. Wynn—Don't it heave up?

Mr. Preston—No, sir.

Mr. Patch—I would like to ask, have you room in the ball of your guard rail to put a bolt through the main rail and have it complete?

Mr. Preston—You only take an inch and a fourth, yet we can give you a foot play if necessary.

Mr. R. Black—When they get time, they should furnish the Secretary with a blue print or drawing, so that it may be put into the book.

Mr. Preston—If some one will jog my memory about this matter, I will send to the Secretary a blue print of that kind of a guard rail.

Mr. R. Black—It is only for the opinion of the Association that I call for.

Mr. Preston—Another word. I got up this guard rail myself, but could hardly say it was entirely my own idea. But I commenced using it, and have used it with other parties who, I understand, have put it in and ordered more. I believe I was really the originator of it.

Mr. Shea—C., N. O. & T. P.—If I were the originator it, I should have a patent on it. [Laughter.]

Mr. Shanks—I would like to ask Mr. Preston, if there enough room between the head for spiking properly.

Mr. Preston—Yes, sir.

Mr. John P. Ramsey—Mr. Preston, one question. In putting down your crossings, you sometimes have a joint o the main track rail. How do you get around that?

Mr. Preston—We have to cut off the ball where the join occurs, leaving the flange and web.

Mr. Ramsey—Then how will you bolt the guard rail to the main rail?

Mr. Preston—You have all the room in the world to do it.

Mr. Ramsey—Mr. Preston, what objection is there, in place of cutting the base of the rail, to drill right through the base of the rail? It would be easier.

Mr. Preston—It can be done both ways.

Mr. W. E. Clark—I would say that I have used this Preston guard-rail crossing less than thirty feet long. I removed my joints, so as not to have any joints in the crossing is room to spike right down through. The ball of my its in so tight there that it can not come up.

. Preston—I have never fastened one down. It can be .

. W. E. Clark—I have done it, and have used the other rail. If he places the distance one and three-fourths s, he will have trouble in throwing horses. But if sepd to three inches there will be no trouble. I had one run one and three-fourths inches, and had trouble with t separated it to three inches, and that ended the diffi- .

. Wynn—Now, I have had considerable trouble of this e—right in the Union depot at St. Louis. We have sands of people traveling across our tracks, and you are vare that the flange must have room to travel on the e of the rail. Now, if we were to adopt this idea, we have too much bending. You well know that in St. s we have refined, delicate ladies who wear shoes from ber two and a half to four and five; pretty shoes. ighter.]

ie President—I will call you to order, as we are not disng a cattle guard for human beings. [Laughter.]

r. Wynn—This is for safety for everything passing over crossing.

ie President—Do you have them in the Union depot?

. Wynn—Yes, sir; traveling both East and West and the platform. And a child with a small foot coming would be thrown, unless care was exercised in walking , and break his ankle. Too much care can not be exd.

J. P. Ramsey—I rise to a point of order. These guard re not intended for depots.

Wynn—It is the same whether in cities or out, on the e, etc.; and it acts just the same whether one or one and.

Preston—The complaint this gentleman makes in this as no foundation whatever. It is an impossibility for a human being or a beast to get his foot into that guard rail. It can't be done either one way or the other.

Mr. McInarna—What was the object in using a bent plate instead of a flange?

Mr. Preston—Safety and economy. A plank rots easily. You may put in a plank, it is sure, and make a flangeway, but it is always filling up with snow and ice. The crossing must be picked out every day or twice a day; while, with this kind of an arrangement, the crossing is clean all the time, and it can be correctly and easily swept out. You have a crossing that does not bother you at all, either with snow, frost or ice. The first expense is a little more than the plank, if you put in broken stone.

Mr. McInarna—In filling up, don't you reduce the space for snow?

Mr. Preston—The smaller the space the less the snow. Now, I would like to ask any gentleman here, how he can get any snow or ice to pack into that when the space is so small? That is what it is for, to avoid expense. You can use concrete or broken stone.

Mr. W. E. Clark—The gentleman spoke of economy. Altogether, it is a safety crossing. No trouble is had with it in winter. It cleans itself. That is my experience with it.

Mr. McInarna—Another word. I would like to hear from some one else in regard to the cattle guard. Of course I can state my ideas, which are in favor of the surface cattle guard, which does away with the opening and all heaving of track. By using the surface cattle guard, all that is done away with, and I think you will all agree with me.

Mr. Black—I think we have all come to the conclusion that the surface cattle guard is the safest, and if there is no objection I will call for the question.

Cries of "Question, Question."

The President—All those in favor of adopting the report of the committee will signify the same by saying, "Aye."

Report adopted unanimously.

The President—The next subject is "Track Tools and I plements for the Maintenance of Way." We will leave t for to-morrow. The next in order will be proper questio the discussion relative both to the duties of members and the appointing of committees. Is there anything in that line to present?

Mr. Clark—Mr. Preston has a communication, I believe, from a friend, which he desires to present to the Association.

Mr. Preston—I have an address that I should very much like to read to the members.

Mr. John Doyle—I move to suspend the Rules and appoint a Committee on Resolutions.

The President—We are acting under the head of Miscellaneous; that comes in under the regular order of business, under No. 8 of the By-laws. Your matter will come in after Mr. Preston's address.

Mr. Preston—Mr. President, with your kind permission, I will offer the following address:

Gentlemen of the Convention:

We are assembled for practical purposes, and it is scarcely appropriate for us to indulge in much, if any, mere abstract talk. We represent a department in the most wonderful species of highway—a department which I had occasion to say some years ago, in an address delivered at St. Paul before this association—was the most important of all the departments of the whole species. This assertion, I think, can be conscientiously adhered to.

At the close of the year 1888, there were in operation in the United States 156,082 miles of railroad. Over this vast highway there was carried during that year 451,353,655 passengers, which is equal to 11,190,613,679 moved one mile.

There was also transported 589,398,317 tons of freight.

The estimated gross earnings were $960,256,270, and the net earnings, $301,631,051.

This entire carriage of precious lives and valuable freight was done with a percentage of loss so small as to be scarcely worthy of computation, and the percentage of error attributable to defective road-bed, to roadmasters or to men under them was even yet smaller. By this we see that there has been effective service in the road department. This also shows the importance of railway companies securing and retaining the services of the most proficient, experienced and reliable men in this department.

This enormous mileage in the United States represents the Roadmasters' Department. Its stability and safety depends, and will continue to depend, upon the ability and capacity of the roadmasters, and those occupying positions of trust and responsibility under them. Upon the roadmasters, therefore, rests a primary responsibility to which belongs the safe carriage of the multitude of human lives and the vast cargo of wealth.

When viewed from this standpoint with a careful comprehension of all that such a service involves, measuring the length and breadth of duty thus imposed, you will agree with me that the ability and capacity of the men in charge of this department is an important subject; and the purpose of each roadmaster should be not only to increase his ability and capacity, but most properly to raise a standard of comparison by which to judge of the relative importance of the men in charge of this and other departments.

It is no doubt true that men will strive and be ambitious for the highest standard, only as they show, know and feel that the position, in the eyes of the public and of the world, to which they shall attain by reason of their ability, is properly appreciated.

But in gaining this, we should not only look to faultless construction or repairs. We are not only to consider the important physical elements with which we have to deal, but also the thinking human beings, by whose aid in muscle and certain intelligence, we can only successfully work out the object of our service.

I hold it to be true that there can be no such thing as able, capable and successful management of this or any other department of service that necessarily deals with men, which leaves out of view and out of practice the proper humane, as well as prudent, and economical consideration of them. Ability in this department, therefore, means not alone the most economical use of earth, stone and timber—not only the securing from human muscle the most work for the least money—but it means also such a management and such a dealing with the mind and intelligence of the men to whom that muscle belongs, as shall render to them fairness, justice and humanity, and thereby secure from them not merely perfunctory, but hearty and grateful service. It means more than this—it means fair dealing, humane treatment and a reasonable recognition of the wants and necessities of our common humanity, such as shall, while advancing us, at the same time advance them.

The times are ripe for a practical application of the idea that the public good requires the elevation of the laborer—no matter how humble his position. As population increases, as wealth accumulates, the proportion of the laboring masses grows. It is the great sub-stratum of society. Upon not only its comfort, but its intelligence, rests the peace and good order of society, as also the best service to the employer.

As managers, therefore, of bodies of men, we owe it to ourselves, for our own better advancement, and to the public for its good, that we look beyond mere physical power, and do what we can toward elevating them on the intellectual plane.

y all other departments of employment, ways and means to
ve been devised. It is important that it should be done in
l as other departments.

en said that "to be influenced by a passion for the same pur-
o have similar dislikes, is the rational ground-work of lasting
"

lso been said that "long experience in railway work begets
in special duties, and the feats which bridge and other gangs
m, are often more wonderful than many of the more showy
ces of railroad engineering. It is an every-day thing with such
ke down an old wooden structure and erect in its place an
perhaps with track raised several feet above the level of the
hile fifty trains pass every day, not one of which will be de-
moment."

ords will apply, as well to many other and parallel cases which
sent themselves to the mind of the Roadmaster. These new
must be erected; renewals must be made; the trains must be
r their safe passage over such places the Roadmaster, and
tly under his control, are held responsible.

ineer who designed the bridge, or other work, and prepared
te plans and specifications, deserves all the credit that is given
e responsibility of execution far exceeds that of design. Be-
ans are finally adopted, they can be reviewed and revised with
n. Consultations can be had, and everything and every detail
led before a dollar is spent in construction. But when the
s, problems daily and hourly arise which must be solved then
and action taken before the arrival of the next train. Here
cy of the roadway department receives its test.

his efficiency, and the betterment of the whole service, physi-
nentally, to be maintained and increased?

going into a general discussion of the subject, I desire to say
judgment, the proper organization and maintenance of this
would largely contribute to the desired end, and I desire,
onsider the future of our organization.

by a writer in the July (1885) number of *Popular Science*
There is hardly a condition or a professional society that does
need of bringing its members together and of holding at dif-
always agreeable places, social reunions."

anner can be brought together "those influenced by a passion
e sursuits."

ld combine the practical and the social, or, in other words, we
cuss the intensely practical questions of our profession in a
ner.

al meetings are, as they should be, of great benefit to us; but
together for the sole purpose of solemnly deliberating in par-
session upon the very work and questions that have been

constantly in mind day and night during the past year, our Convention will become tiresome, the membership of the Association grow small, and the attendance smaller.

A gentleman, who led a very busy life, with a good deal of worry and anxiety in it, once declined to attend a theater to hear some famous tragedians, because, as he said, "there was enough tragedy in every-day life." So, when we are assembled we ought not to spend all our time in [illegible] or making [illegible]. We might derive pleasure and profit from an address by some one outside of our own profession. An able railroad lawyer, manager, superintendent, or some well-known scientist might be called upon.

Now a few words as to the plan of the Association. Would it not be well to consider the advisability of organizing State or District Associations to be tributary to this Association, and then, if deemed best, while all members of the minor Associations would be members of the parent society, let them be represented at the annual meetings by delegates, who would bring with them reports from the meetings of the State organizations. These reports would no doubt furnish abundant matter for discussion.

Among the advantages that might be derived from this plan, are the following:

More would attend and secure the benefits of exchange of views and [illegible].

The features peculiar to a certain territory could be discussed at length and in detail without occupying the time of those not so directly interested therein. For instance, the Illinois Association could discuss matters peculiar to [illegible], while the Colorado brethren would [illegible] problems, and the Mississippi Society to [illegible].

[illegible] organizations, made to the parent Association [illegible] distributed, and the benefit thereof give[illegible]

[illegible] representation in the general Association [illegible] good attendance would always be secured, proper p[illegible] being made to substitute in case any of those appointed could [illegible] attend. The appointment of delegates need not be considered as an [illegible] stay away, but with delegates it should be a du[illegible] and with other members a privilege to attend the annual meetings of [illegible] parent Association.

I would like to have you, gentlemen, consider this matter, and if deemed advisable appoint a committee to review the subject in det[illegible] and if favorable to the scheme, make a report which shall include a p[illegible] for the organization of junior Associations.

It has been suggested to me that if this kind of an organization is effected in each State, an insurance of members could be made, if thou[illegible]

Mr. Burnett—In the chair—What disposition do you wish to make of that address?

Mr. Ellis—I move that it be made a part of the proceedings.

Mr. Craig—Before you put that, I have some remarks to make on that subject. Mr. Preston is well known to every member of the Association. Mr. Preston has made an address that does him credit. It is a well-written article, and is, no doubt, consumed a great deal of time and labor. But it will, no doubt, occur to you that there is one recommendation he makes upon which he offers no way to carry it, and that is, the organization of the State Association. Again, that paper is a part of the proceedings at this Convention. It goes into the proceedings, and no further. If you desire to carry out the scheme, there must be some method of procedure to be used; otherwise, the paper will go as written, and we will hear nothing further from it. I would, therefore, move that the paper be returned to the gentleman writing it, asking that he offer some mode of procedure to carry out the method of organizing State Associations, as recommended by him.

Seconded and carried unanimously.

Mr. Preston—I would like to ask that a committee of five be appointed to help "the old man" out this evening.

Mr. President–I desire to suggest that such gentlemen be named by him, as he desires to have associated with him on that committee.

Mr. Preston–Well, I would much rather the chair would appoint them.

The President–Then I will withdraw my suggestion. As this is a matter of a great deal of moment, I will appoint a list of members to assist Mr. Preston this evening.

The President–Mr. Craig in the chair—We have some communications here, which I will have the Secretary read for your benefit.

The Secretary here read a letter regarding the adopting of a style of badge—one which should remain permanent.

Mr. Black—I think it would be well to appoint a committee on the furnishing of a design; not one, but different kinds, and let them be submitted to the Executive Committee for approval.

The President—At what time?

Mr. Black—I do not think we can consider this matter satisfactorily at this meeting, but perhaps may at the next. The getting up of a badge of that kind cannot be done in a day. There should be at least half-a-dozen kinds of designs and specimens for consideration. It should be presented at the next meeting of the Executive Committee, that it may be ready for consideration at the next annual meeting, and I would make that motion.

Unanimously adopted.

The President—This Association has had an experience of seven years, going into the eighth. It is necessary you should all know the relations of this Association to the higher Associations, the first being the Superintendents' and next to them the General Managers'.

I will now have read for your information that portion c the discussion at the last meeting of the Superintendent Association, which bears on this Association. To those w have not seen this report, it will be a matter of interest a information to them.

The Secretary—I will, with your permission, read cert extracts from the remarks of Mr. Gadsen, the President the Superintendents' Association:

> "If we have done our duty here and paid attention to what is b said, we get information which we carry home and make valuable t railroads themselves; and surely we are more valuable to them th we stayed at home and only superintended train service. I say the the advantages to be derived, both personally and officially, from terchange of views here. No one can come here without getting a deal of useful information. Now, sir, the different organizations country have been working on parallel lines of suggestion and mendation just as you said, but nothing has been accomplished pared with the whole field of legislation of all these bodies, ex perhaps, the very little which has been done in the Time Co They have all made suggestions, and what have they resulted i this is the body before whom those recommendations and s

should come up for approval. The General Time Convention has not undertaken general legislation. Its conventions have been confined to legislating only upon such items as have been brought before their executive committee, and such as their executive committee are willing to introduce before the convention. Now, I say there is abundant room for both of these organizations, and I think we ought to go before them and explain our situation. We might be perfectly willing to unite with them whenever our co-operation can be of real benefit, but I think that our organization has a special field of its own. I, therefore, urge a continuance of this organization, hoping that it may become a strong, vigorous body and accomplish grand results. We have invited, from time to time, correspondence with other organizations. The head of the Roadmasters' Association is a gentleman who is our own Roadmaster, and whenever there is any matter that has received definite and positive action by his convention, I say to him: 'Bring it to me and I will put it before the Superintendents' Association.' I think if we will unite with each other, we can make this essentially a live organization.

"I think we should have arranged a comprehensive system of railway investigation and discussion, so that a matter need not be talked over by us that more properly belongs, say, to the Roadmasters first to talk over—and which, when they have reached a definite conclusion upon it, they could pass up to this Association. Then it would be for us to add to it, improve it, approve it or disapprove it, and so pass it along to the General Time Convention, should it wish to participate in such action. I do not know that it is its intention to occupy so extensive a field. That may be the reason why it does not at present wish to encourage this enlarged system of conference and discussion."

ROADMASTERS' ASSOCIATION OF AMERICA.

OFFICE OF SECRETARY,
WASHINGTON, D. C., September 14, 1888.

Mr. C. S. Gadsen, President Association of North American Railroad Superintendents, Charleston, S. C.:

DEAR SIR—In reference to the subject of standard, solid and spring-rail frogs, which was passed upon at the convention of the Roadmasters' Association, in 1886, and referred by the President of that Association to the Association of Superintendents, and whose action in this convention of 1888 is referred to in your letter of August 11th, addressed to me, I beg to state that all papers bearing on this subject were referred to a committee of the Roadmasters' Association, who reported as follows:

WASHINGTON, D. C., Sept. 11, 1888.

To the Roadmasters' Association of America:

Your committee, appointed on the subject of dimensions for standard frogs, as passed by the Roadmasters' Association in 1886, and which was referred to the Association of North American Railroad Superintendents, and acted upon by them in their meeting in April, 1888, and again returned to this Association for further consideration, beg leave to submit the following report:

That we concur in their recommendation on the following points, viz.:

As to the durability of the spring-rail frog, and favor its use.

In the preference of the riveted frog over the clamped frog.

In the third recommendation, of sufficient width of heel to admit splices without any, or the least possible, cutting.

In the length given for distance from heel to point, and also in the lengths from point to toe, for stiff and spring-rail frogs.

With the fourth recommendation, that the guard-rail distance and width of channel, or throat of frog, be not less than one and three-fourths, nor more than two inches.

With the fifth recommendation, that the guage should be exact at all points of the frog, except where the point is beveled.

(Signed)· P. NOLAN, Chairman,
D. H. LOVELL,
O. F. JORDAN,
R. CAFFREY.

Finding that the time set apart for our discussion would be fully occupied with the regular order of business, and, wishing to give this important subject the full consideration that it deserves, in view of the differences that have been expressed, upon resolution the Association decided to return the matter to the committee to report at the next meeting, and to provide every member with a copy of the reports and blue-prints, with a request to assist the committee with all the information in their power.

Very respectfully,
J. W. CRAIG, *President R. M. A.*

The President Now we come to a matter I wish to dispose of this evening. The necessity of it is this. The Union Pacific and other railroads we are to go over on the excursions, have limited me until to-day to give them a report of the number desiring to accompany those excursions.

I will have the Secretary call the roll and have each member answer. Mr. Gilchrist, the Superintendent of the Union Pacific, has requested me to give him this information not later than this afternoon. Each member will have some two or three, as the case may be, who wish to accompany him.

You must be promptly on time at 9:30, and thus you will be able to get through at 12:00, or a little after. If we can get through at 12:00, it will enable us all to take a ride, and have a thorough view of the city of Denver. I hope you will all be here promptly on time.

Adjourned until to-morrow morning, Thursday, September 12th, 1889, at 9:30 A. M.

Thursday's Session.

THURSDAY MORNING, September 12th, 1889.

The meeting was called to order at 9:30 A. M.

The President—If there are any gentlemen present who did not answer to their names yesterday when roll was called, to ascertain who were going on excursions, we would like to know who they are, and to have them attend to the matter before participating in the regular work. When we adjourned last evening the Chairman on "Cattle Guards and Crossings" asked for further time.

Mr. Doyle—And that was on account of the laws of the legislatures in the different States. Each State has a different law. We wish to conform to these laws in order to make an intelligible report, and asked for further time to do it.

The President—The next business in order will be the reports of the committees. The first report in order will be that on "Track Tools and Implements for the Maintenance of Way." Mr. James Sloan is Chairman.

Mr. James Sloan—I would ask for further time.

The President—Then we will now take up the reports on special committees. The committee of which Mr. John Sloan is chairman will now report.

The Committee on the Address of Mr. J. H. Preston would beg to be allowed more time, during which to consider the subject presented, which is so weighty and of such a character that the Committee, having not even thought upon it before it was presented for their consideration, hesitate to offer their decision without more thought, preferring it to lay over till next meeting.

JOHN SLOAN, Chairman.
O. F. JORDAN,
C. E. JONES,
JOHN P. RAMSEY.

r. Ellis—Would it not be well to have the committee rt at the next executive meeting? If you have the fixed before our book of proceedings is issued, it can ublished properly.

e President -I suggest no motion, nor express any ion.

r. John Sloan– Mr. Ellis refers to the members who passed away during the past year. There was nothing e report of Mr. Preston referring to those members at You have the report, I believe.

e President—The next committee to report is that on solutions." Mr. Courtney, Chairman.

r. Courtney—I desire a little further time.

e President—The Committee on Deaths is the next mittee. Mr. Caffrey is Chairman of that committee.

r. Caffrey was not present.

e President—We will await the committee. If there is other business before the Association, we will act upon til the reports are ready.

r. Black—Mr. President, I move that the rules be sus- led as provided for in our Constitution, Article No. 22.

e President—You have heard the motion to suspend rules. On request of the President, Mr. Black reduced otion to writing.

will put the motion. All in favor of suspending the s, as provided for in Article No. 22 of the Constitution, say "Aye." Those opposed, "No."

e vote was not understood, and a rising vote was called The motion was lost– twenty-three "nays" to fifty-five as."

e President—Is there any other business before the mittee's report?

o reply.

e President– We will have to await the reports of the mittees.

r. W. F. Ellis -P. N. & W.-The Committee on Reso- ns have this to offer, and I offer it in the name of the mittee as Secretary:

RESOLUTIONS.

Resolved, That the thanks of this Association be expressed to the citizens of Denver, to the President and members of the Chamber of Commerce for the many favors extended to us, individually and as members of this Association. And also for the many courtesies shown to our wives and families during their pleasant sojourn in this city.

Resolved, That as an Association, we express our thanks and appreciation for the many courtesies extended to the members and families of this body by the managers, superintendents or other officials of the various railroads over which we have passed, and also to the Pullman Palace Car Company.

Resolved, That the thanks of this Association are due to the Union Pacific Railroad Co. and to the Denver & Rio Grande Railroad Co., especially to Superintendent Gilchrist, for his untiring efforts to make our visit to Denver very pleasant, and also for the pleasure and instruction to be derived from the various excursions planned for ourselves and families to points of interest along the lines of these railroads.

Resolved, That this Association, realizing the responsibilities resting upon its officers, that on them, to a great extent, depends its growth, position and life as an Association, do hereby extend our sincere thanks to our President for his efficient and gentlemanly services thus far rendered to the Association; to our Vice Presidents, Secretary, Executive Committeé, the reporter, and to the members of the other committees for their laborious, self-sacrificing services in the Association's behalf.

Resolved, That the members of this Association recognize the elevating and refining influence derived from the presence of the ladies attending the meetings of this body, and hereby extend to them a cordial invitation to be present at our future conventions.

Resolved, That our thanks are due to the representatives of the numerous manufacturers of railroad appliances exhibited at this convention for the information and benefit derived from the varied display so conveniently arranged for our inspection. That we are also grateful to them for the many courtesies shown to our families and ourselves by these representatives.

Resolved, That members are requested to give to the Association, in a written communication, at any meeting, conclusions they have arrived at on any question upon which they have expressed an opinion in former years, which opinion they have changed through the progression made in their work. Also, that members of the Association will experiment, when allowed to do so, with any new tool, device or appliance of interest to Roadmasters, that shows improvement or merit, and is presented to them for trial; reporting the conclusions they may reach from such trials nents in a written communication, giving the data, if possible, ch such conclusions are derived.

W. H. COURTNEY,
W. F. ELLIS,
J. SUPPLE,
C. E. MARVIN.
J. A. KERWIN.

President —You have heard the report of the Com- n Resolutions. What is it your pleasure to do with

otion, it was unanimously adopted.

ames Sloan—Mr. President and Gentlemen of the tion, I will read the following report:

ident and Gentlemen of the Roadmasters' Association of America:

ommittee on Track Tools for the Maintenance of Way beg ubmit the following report:

ction of five miles, with a force of five men and a foreman, uld be the following named tools:

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2 Gauges, track.
1 Grind Stone.
3 Grub Hoes & Mattock.
6 Handles, pick.
1 Handle, axe.
2 Handles, adze.
6 Handles, hammer.
4 Hammers, spike.
1 Hammer, sledge.
1 Hammer, napping.
1 Hatchet.
2 Lanterns, white.
2 Lanterns, red.
1 Lantern Globe, white.
1 Level, track.
1 Level, boards.
2 Levels, blocks.
6 Picks, clay.
6 Picks, tamping.
1 Punch.

2 Pad Locks.
2 Rail Tongs.
6 Scythes.
6 Scythe Snaths.
6 Scythe Stones.
6 Shovels.
4 Shovels, scoop.

1 Saw, hand.
1 Saw, cross-cut.
1 Rail-saw for every 50 miles.
1 Jim Crow for every 50 miles.
12 Torpedoes.
1 Track, tack.
1 Tape Line.
1 Track Lever.
2 Wheel Barrows.
4 Wrenches, track.
1 Wrench, monkey.
1 Water Keg.

JAMES SLOAN,
J. A. KERWIN,
JOHN DOYLE,
JOHN SCOFIELD,
JOHN P. RAMSEY,
W. F. ELLIS.

The President—You have heard the report of the committee. What is it your pleasure to do with it?

It was moved and seconded that the report be accepted.

Mr. Preston—I see no particular objection to the report of the committee further than this: The red lights and white lights on some roads throughout the country are being used, while on other roads green lights are being used. These are not included in that report, and they should be. Now, take it, for instance, on the Rock Island system a green flag and green light is a slow signal of danger—a precautionary signal. I move the green signals be added.

Mr. James Sloan—I'll admit that.

Mr. Thomas Hickey—For a wild flag we use a white and a blue flag. We use no lights for a still signal. I think Mr. Preston uses a green flag.

Mr. Purcell J., M. & I.—I think it is a little difficult to arrange in this matter to suit all roads. For instance, on the J., M. & I. we use green, white and red flags and lanterns.

Mr. Ramsey—We did not mention blue lights in the report, for the reason we wished to have fixed and uniform signals throughout the country. Now, it is well known that different roads use different colors for the same signals, and it is not intended that they should be changed unless it is desired; but we have given the red light for danger and the white light for safety. The other lights need not be changed, as many roads have their own particular signals.

The President—This report is not mandatory. Therefore, if adopted, it is for you to accept the responsibility.

Mr. Lane—I recommend the use of the red and white signals only, it seems to me, it is coming back to the time of the first beginning of things. I understand that red means danger. Throughout the East, I think, that is generally adopted. Red means stop, green the precautionary signal, and white all right; and, I believe, in a few years the universal use of these colors with others will be established in the United States.

Mr. Jones—I think the report of this committee has nothing to do with the signal used on any road. On our road we use three signals—red. green and white. Red means danger, green caution, and white safety. Of course, no road will change their signals, their lamps, lanterns or flags, by reason of this report, yet the tendency will be to become uniform in time.

The President—I will state for the information of the Association, though there are, no doubt, a great many present to whom it is not necessary to give this information, that all systems whose management are members of the Time Convention have adopted the signals mentioned by Mr. Jones. They are the recognized signals of all members of the Time Convention—red, blue and green. If necessary for any other signals, it may be covered by a local order.

Mr. Mead—I would like to add a water keg.

Mr. Sloan—There is a water keg there, too.

Cries of "Question, Question."

The report of the committee was unanimously adopted.

Mr. W. E. Clark—I would offer a motion that the report of the Committee on Resolutions be made a part of the proceedings of the Convention.

Carried.

The President I would state for the information of those desiring to go on the excursion, that it will leave the Union Depot to-morrow morning at 8:00 o'clock. It is desired by the management that we have our photographs taken in a group near the snow plow this afternoon. The ladies will get through as soon as possible, although there are hand cars to examine at the depot, and other objects of interest.

The next thing in order now is the report of the Committee on Deaths. I suppose the chairman has retired. Mr. Ramsey, I will appoint you a committee of one to determine when they will report. If there are remarks that the members desire to bring up, it will be in order, in the meantime, to do so.

Mr. John Sloan--When will those photographs be taken, this afternoon?

The President--When we adjourn we can fix the time. He said 12:00 o'clock.

ters were included in the Minutes of our meet
move that the same be published in the proce
year.

Carried unanimously.

The Secretary—In order to carry out that re
will be necessary to have members in attendanc
their cards, with the names of those accompanyi

The President—That is the only way we can ge
report, giving the names of all the ladies and c
companying them.

The names of the wife and members of the fam
Roadmaster present at the Convention of 1889
fore handed to the Secretary, as follows:

List of Ladies in Attendance upon Convention

Mrs. Geo. E. Ayer,
Miss L. M. Burnett,
Mrs. S. H. Brown,
Mrs. W. H. Courtney,
Miss Anna R. Courtney,
Mrs. John Doyle,
Mrs. G. B. Dickson,
Mrs. Thomas Dickson,

Mrs. G. W. Bish
Mrs. T. J. Brown,
Mrs. J. O. Boyle,
Mrs. W. E. Clar
Mrs. W. G. Didd
Mrs. Garrett Da
Mrs. E. P. Edwa
Mrs. J. K. Gedde

Miss Maggie Rafferty,
Mrs. M. A. Stafford,
Mrs. J. Supplee,
Mrs. John Sloan,
Miss M. E. Sloan,
Miss B. E. Sloan,
Mrs. J. C. Smith,
Mrs. C. E. Shepard,
Mrs. J. W. Wright,
Miss M. L. Preston,
Mrs. H. W. Reed,
Mrs. Rosamond Rockhold,
Mrs. W. H. Stearns,
Mrs. J. M. Sterling,
Mrs. James Sloan,
Miss Minnie Sloan,
Miss Elsie Scott,
Mrs. D. Sheahan.

r. Clark—I move that we allow this report of the Com-
ee on Deaths to be made to the Executive Committee,
examined and prepared for our report of proceedings
he current year.

rried.

e following is the report of the Committee on Deaths:

e Officers and Members of the Roadmasters' Association of America:

s our painful duty to announce to the Association the death of Mr.
as Dickerson and Mr. Charles W. Burgdoff, since our last annual
ng.

. Dickerson died at Weldsville, Ohio, January 30, 1889. At the time
death he was sixty-four years of age. He was born in Scotland in
He came to this country in 1852, and entered the service of the
land & Pittsburg Railroad Company, where he remained until the
of his death, occupying in the meantime various positions. He
as foreman of a floating gang, rising, through his energy, to the
sible position of Roadmaster.

Dickerson was an upright, capable and efficient officer in every
n which he filled. He was also a sincere and devoted Christian
ustee in the church to which he belonged. He also was a mem-
the School Board in the city in which he lived.

as a most devoted husband and kind father, and we recognize we
st in his death, a true associate.

nder our heart-felt sympathy and condolance to wife and children,

harles W. Burgdorf, Roadmaster on the Union Pacific Railroad,
our most *esteemed, genial and energetic* members, died at Denver,
arch 21, 1889, by an accident which befell him while in the per-
ice of his duties.

ough Mr. Burgdorf has met with us but once, we all had learned
w him, and to appreciate his straightforward and his forcible
d of presenting his ideas to this Association, and trying to uphold
ry possible way what he advocated and what he honestly believed
o *the best interest of the* railroad to which he belonged.

As all the members that were at the Washington meeting well know, it was at his earnest solicitation that the present meeting is held in Denver, and all who then heard him looked forward with great pleasure to his genial reception and companionship at this meeting.

We, therefore, sincerely regret his untimely and unlooked for death.

Resolved, That a copy of this be spread on the Records of this Association. (Signed)

R. C. Caffrey,
O. F. Jordan,
G. W. Bishop,
W. G. Choate,
M. J. McInarna.

The President—The next thing in order is the election of your officers. We will commence right at the head of the list. So name your candidates for President.

John Sloan and W. H. Courtney were nominated.

Mr. John Sloan—I would respectfully ask Mr. Ramsey to withdraw my name as a candidate for President.

No response.

Mr. John Sloan seconded Mr. Courtney's nomination.

Mr. John Sloan's nomination was seconded by several.

Mr. R. Black was nominated.

Mr. Burnett—Mr. Black is already an officer of the Association, and I do not see how he can serve in two places.

Mr. John Sloan—I earnestly request that my name be called.

No response.

Mr. R. Caffrey was nominated.

The President—Mr. Hickey and Mr. Ramsey will please take the votes and return them to the Secretary. Gentlemen, prepare your ballots.

On motion of Mr. John Doyle, the following tellers were appointed: Mr. Doyle, Mr. Hickey and Mr. Ramsey.

The first vote for President resulted as follows:

Mr. John Sloan	38
Mr. James Sloan	22
Mr. R. Black	17
Mr. W. H. Courtney	11
Mr. Richard Caffrey	9
Total	97
Necessary to choice	49

The President—No candidate has a majority.

Mr. W. H. Courtney—I move to suspend the rules and ect Mr. John Sloan by acclamation.

Seconded.

Mr. John Sloan—I beg to withdraw my name. I have as uch work now on my hands as I can possibly attend to, ithout the additional duties of this office.

The President—I would say for the information of the entleman, that this cannot be allowed.

A motion by Mr. Cornell to suspend the rules and vote y acclamation was put and lost. [Applause.]

Mr. R. Caffrey—I move that the three candidates voted r, having the lowest number of votes, be dropped from e list before there is another ballot.

Mr. Richard Caffrey's motion was undecided and a rising te called for, which resulted in Ayes, 60. The negative s not taken.

The Secretary—I will drop the name of Mr. Courtney, . Black and Mr. Caffrey. The candidates now are Mr. n Sloan and Mr. James Sloan.

Mr. James Sloan—I withdraw. [Applause.]

The President—It cannot be done. Gentlemen, give us ur ballots as soon as you can.

The result of the second ballot was as follows:

There were 100 ballots cast, three for members not candies.

he Secretary—Mr. John Sloan has 60 votes, and 37 for James Sloan. Mr. John Sloan has a majority of all the s cast. I move that the election of Mr. John Sloan be unanimous.

ried.

President—I shall be very happy, indeed, to retire, succeeded by such an able man as our friend, Mr. Sloan.

s for Mr. Sloan.

John Sloan—I thank you for your kindness in electyour President, and regret very much that you have so. *The duties*, the work is so great that it is almost impossible for me to give it the attention necessary. There is much work connected with the duties of the office of President of this Association, of which any person, who has had anything to do with it, is aware. I can only hope to improve my time and endeavor to perform my duties as successfully as my predecessor has done, and that, with your assistance, will be my aim. [Applause.]

Mr. J. W. Craig (stepping down from the chair, and Mr. John Sloan assuming it)—Mr. President, and members of the Roadmasters' Association of America, in turning over the office of President to my brother roadmaster, Mr. John Sloan, I can assure you that it affords me no little pleasure to do so. I have been working with Mr. Sloan in our Association since its infancy, and he has never failed to attend a single meeting, and I do not think you could have selected one who deserves the honor more than Mr. John Sloan. [Applause.] While Secretary of the Association, I watched him very closely, and he was untiring in his efforts; there was nothing he could do for the good of the Association during his administration of that office but what he did, and that faithfully, and I can safely say there was no Secretary who ever served this Association that could do any more than he did during the time.

It was at Indianapolis, five years ago, that I was elected, and I have been honored with the office of President each year—three terms—and I can assure you that you have done me a great kindness in electing some one in my stead. Not that I propose to lag in my efforts for the good of the Association—that I will never do, place me where you will. I am going to work for the Association so long as I am a member, and that is just as long as I can. [Loud Applause.]

In turning this office over to my successor, I do so with a membership of over 500 members in this Association, and with something near $600 in our treasury, and we do not owe a single nickel. [Applause.] This result has been brought about not alone by my efforts, but it has been brought about through the combined watchfulness and ion of every member of this Association, and by all the als who have aided me. I do not claim the credit, only member. I will ever carry with me a fond recollection ur connection and experience in the past, and it will be a source of pleasure to me to do everything in my er, while I am in railroad service, to advance the inter- of the Roadmasters' Association of America. [Loud lause.]

he President (Mr. John Sloan in the chair)—The next g in order is the election of First Vice-President.

he following were put in nomination: Messrs. W. H. rtney, John Doyle, C. Riley, C. E. Marvin, and J. W. g.

he ballot is as follows:

Mr. W. H. Courtney	56
Mr. John Doyle	25
Mr. C. Riley	6
Mr. C. E. Marvin	5
Mr. Craig	2
Total	94

he Secretary—Necessary to a choice, 47. Mr. W. H. rtney, having 56, is elected First Vice-President.

ade unanimous.

alls for Mr. Courtney, who came forward.

r. I. Burnett—Mr. President, and Gentlemen of the As- ation, it gives me pleasure to see the office of First -President still held by a good-looking gentleman, ughter and applause] and I hope and believe that his es will be well and faithfully performed. For myself, I served the Association as President for three years. e 1880 we had three meetings. I have held the office irst Vice-President for three years, since, and I think I done my part. To those who have been kind to me, have my best wishes, and I assure you that everything n do to aid the continued success of this Association, l be done with all the vigor I can summon. [Applause.]

r. W. H. Courtney Mr. Chairman, and Gentlemen of Convention, I thank you for your kindness in electing me to the office of First Vice-President, and will endeavor to do all I can for the interests of the Association. [Applause.]

Mr. President—The next thing in order is the election of Second Vice-President. Make your nominations.

The following were put in nomination: Mr. John P. Doyle, D., L. & N., and Mr. McInarna, N. Y., P. & O.

Moved and seconded that nominations close.

Carried.

Mr. John Doyle—If not out of order, I will withdraw my name. [Voices, "You cannot do it."]

It was moved that Mr. Doyle be nominated by acclamation, but decided out of order, and the ballot ordered, which resulted as follows:

The Secretary—The total number of votes cast is 86, necessary to a choice, 44; of which Mr. John Doyle receives 78, and Mr. M. J. McInarna, 8.

On motion of Mr. McInarna, the election of Mr. John Doyle to the office of Second Vice-President was made unanimous. [Cries of "Speech! Speech!" and applanse.]

Mr. Doyle came forward and was introduced by the President.

Mr. Doyle—Mr. President, and Members of the Roadmasters' Association, I feel much like the Irishman when the police came for him, "A little unasy in me mind." [Laughter.] I wish I knew better than I do, how to act upon your electing me your Second Vice-President of this Association. But I think the most appropriate thing to say from my standpoint is the old-fashioned phrase, "Gentlemen, I thank you." I am glad to be able to take the place, and hope to be able to successfully fill it, and I assure you my motto will be, as old Blucher said, "Forward, March." [Applause.]

The President—The next thing in order is the election of Secretary and Treasurer.

Mr. W. H. Reed—The Secretary—I desire to place in nomination for Secretary and Treasurer, Mr. John P. Ramsey, of the C., H. & D. road. I will state my reasons. He is a young man of vigor and intelligence, and, I believe, can carry out the duties of the office with success.

My second reason is, that he is in the neighborhood of the President, and it is very necessary that the President and Secretary should confer frequently, and Mr. Ramsey and Mr. John Sloan, being elected in the same State, can do so successfully.

I also move that the nomination for Secretary and Treasurer be closed.

Seconded by Mr. Courtney and others, and carried. [Applause.]

The Secretary--I move that the nomination of Mr. Ramsey as Secretary and Treasurer be made unanimous.

Carried. [Cries of "Speech! Speech!"]

A voice, "What's the matter with Reed?" The Convention, in response, "He's all right."

The President—In introducing Mr. Ramsey, I introduce an old friend, who has attended our Conventions for years, and has served us ably in several capacities, and I am sure he will be able to carry out the duties of the office of Secretary and Treasurer with due success.

I also, in behalf of myself, have to thank you for the uniform courtesies extended to me in connection with the Secretary in my official capacity, and I also desire to assure you that in my capacity as a private in the ranks I shall endeavor to do my duty as I have endeavored to do it heretofore. [Loud applause.] It has been remarked to me that Mr. Ramsey has served in an official position in this Convention before. You will, no doubt, recollect him as Sergeant-at-Arms in the Convention two years ago. [Applause and laughter.]

Mr. John P. Ramsey—Mr. President and Gentlemen, this is indeed a surprise. I had not, until after my arrival in Denver, an idea that any such change would be made. I have had no experience whatever in this capacity, and can only say, as all others have said before me, that I have plenty of work at home and outside the Association, but will use my best endeavors to fill the position and attend to the business of the Association, endeavoring to reach the high standpoint of efficiency attained by my predecessor. [Loud applause.]

The President As the office of one of the Executive Committee expires this year—that of Mr. S. L. Swinney, W., St. L. & P.—you will please name his successor.

Mr. Robert Black—I would put in nomination for that position, Mr. C. E. Marvin, who, I think, is able to fill any office.

Mr. George E. Cain and Mr. W. B. Stimpson were also nominated, and nominations closed.

The President The nominees are Messrs. Marvin, Cain and Stimpson. Prepare your ballots.

The Secretary announced the ballot, as follows:

C. E. Marvin	32
George E. Cain	38
W. E. Stimpson	9
Total	79

The number necessary for a choice is 40. No one elected

Mr. Black I move that the candidate having the leas number of votes at each ballot be dropped.

The Secretary—The members now up for election are E. Marvin and George E. Cain.

The second ballot for member of the Executive Comm tee resulted as follows:

Number of votes cast, 87; necessary to a choice, 44.

C. E. Marvin	29
George E. Cain	58
Total	87

On motion, Mr. Cain's election was made unanimous-

Mr. Craig Mr. President, and Members of the Roadm ters' Association of America: Mr. George E. Cain is in posed, that is, he could not attend the morning session

Convention. In his behalf, I will say he has been a nber since I joined the Order, and has done his duty as as any man could. I assure you, from a personal standit, that he will perform the duties of his office like a l.

he President—The next business in order is the selection place for holding our next annual meeting.

he city of Detroit, Mich., was mentioned; also St. Paul, n.

[r. Mead—Kansas City is the place that a dozen trunk s run into, and has as much yard work as the largest of cities, and I know they will receive and take care of us ood style.

[r. Purcell—I would name Louisville, Kentucky.

[r. Cornell—I would name Chicago. [Laughter.]

hattanooga was also named. All the above were seced.

he President—The nominations are closed, gentlemen, we will now proceed to ballot.

r. John Doyle—If the Roadmasters will come to Detroit, ll guarantee you one of the best times you ever had in life. [Applause.] We have the best water works of place in the country, and you can reach the town by at ten different roads. Yes, we have some of the finest s leading to Detroit, and I will guarantee you that when come to Detroit, you won't have to go down into your ets for three dollars a day. [Laughter and applause.] n't think of it soon enough, but I telegraphed General er, and presume his attention will soon be brought to matter. I know he would tender you a right royal reion, and see that you come to the city of Detroit. See you do it, and we will take care of you right royally, receive you with outspread arms. I hope the General's sage will arrive before the ballot is completed. Detroit lay them all in the shade. Take my word for it. [Apse. *Cries of "Detroit!* Detroit! Detroit!"]

A large number seconded the motion for Detroit as the next place of meeting.

Mr. Black -I would like to inquire of Mr. Doyle if he is not a real estate agent in that city; if so, I would like to get a few pointers. [Laughter.]

Mr. Doyle--Like the common Roadmaster, I only wield the maul and pick. [Laughter.] Gentlemen, there is one thing I forgot. If you will come to Detroit, I will just have the Chief of Police locked up, so that you will all be fearless and independent, and perfectly at home. [Laughter.]

The Secretary - After ballot, the number of votes cast, 93; necessary for a choice, 42, which were received as follows:

Detroit	76
Chicago	8
Chattanooga	3
Kansas City	3
Niagara Falls	1
Louisville	2
St. Paul	None.

[Loud applause.]

Mr. Craig I offer the following motion: "That the President be authorized to draw on the Secretary and Treasurer for one hundred dollars per annum for clerical work in his office, and that the Secretary and Treasurer have voted him one hundred dollars, additional, for the same purpose." I know the gentlemen need it. I have been there. This is for the coming year.

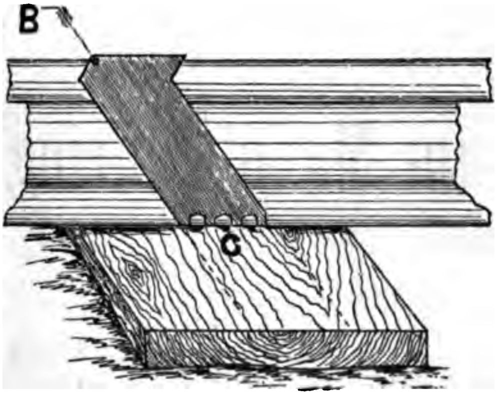
Mr. W. H. Reed I know the duties of the office, and kn a man must employ extra clerical help, and that will c him more than one hundred dollars, leaving him nothing all for his own services; and offer as an amendment to t motion just made, that the salary of the Secretary be ma two hundred dollars.

Mr. Craig I will accept the amendment, and in acce ing it, realize that we run no risk in adopting it, as we ha over six hundred dollars in the treasury, are free from de

SOLE MANUFACTURERS:

DUNHAM MANUFACTURING

* * COMPANY. * *



DAVIES SPIKE.

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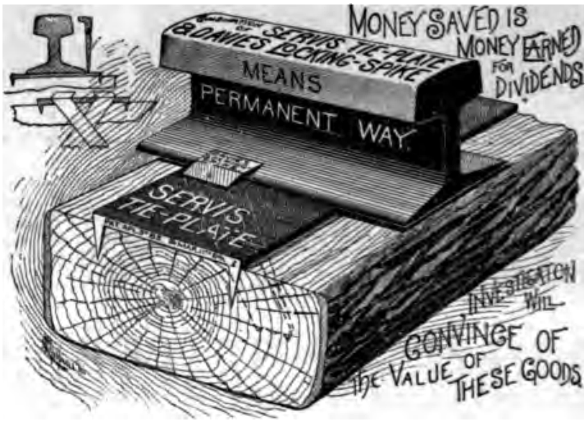

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SOLE MANUFACTURERS:

Dunham Manufacturing Co.

131 Devonshire St., BOSTON,
703-707 Phenix Building, CHICAGO.
32 Morse Building, NEW YORK.
62 Imperial Building, MONTREA

d will not allow the Secretary to incur any expense on
s own account.

Carried unanimously.

Mr. Doyle—On behalf of the grand city of the States, I
e this opportunity to thank you for selecting Detroit as
r next place of meeting.

The Secretary then read a letter from Mr. A. J. Scott.

The President—You have heard a letter read by our Sec-
ary relative to publishing our book. What disposition
all we make of it?

Mr. W. H. Reed—I move that the letter be referred to
e President, Secretary and Treasurer of the Association
r such action as they may think proper, and that the pub-
hing of these proceedings be left entirely in their hands.

Carried unanimously.

Mr. Bishop—I wish to inform those not already in-
med, that in the East we have what is called the New
gland Association of Roadmasters. Our jurisdiction is
ited. I wish to say in behalf of the New England Road-
ters present here, and as a personal duty and pleasure,
we are very thankful for the invitation to be present
you, and also for the privilege of being permitted to
me members of this Association. We also wish to
k you for our many courtesies received and hospitali-
And now I wish to invite you all as as organization,
vidually and collectively, to our New England conven-
which will be held in Boston, on the third Wednesday
ugust next. However, you will receive from the Secre-
in due time a notice of this meeting. I would be
sed to see you one and all, and will endeavor to make
pleasant as possible for you. [Loud applause.]

r. Craig—This is President Bishop, who has just spoken,
he New England Association. He has just been made
ident of that Association. At Washington there were
e members of that Association present, who joined at
annual convention, and we are increased by eight more

at Denver. Now I think they all should turn in and join our Association. If Mr. Doyle had not made his eloquent speech, I was going to make the speech of the meeting, and nominate San Francisco, holding out the inducements of the country, inviting the New England men to be out and attend in full force. [Laughter.]

Mr. Lane—Although this is my first meeting with you, I was one of the old International men at its birth, but not at its death. I was one of the three or four who revived the New England after its death. I have joined you here, and if alive will try and be with you at Detroit. If we get as far east as Detroit, I will warrant that twenty-five of our Eastern members will be with you, and I hope just as many of you will come East to Boston next year, to meet with us, as possible.

Mr. Bishop—One moment more. I did not intend to refer to the old organization; but so long as it has been referred to, I wish to say that I was one of those that met at Greenfield to help organize the old International, and I have come to join your Association, to stay with you and to be present with you, and to work for the interests of this Association. [Applause.]

Mr. Burnett—Referring to the old Association, I was one of four at its death.

Mr. Courtney made the motion to appoint a committee of five on reception, to arrange for our meeting in Detroit next season, and that the members be as follows: John Doyle, D. L. & N.; O. F. Jordan, M. C. R. R.; W. H. Courtney, L. S. & M. S.; Thomas Hickey, M. C., and John Ross, F. & P. M.

Mr. Craig—I will state personally, for the benefit o members intending to visit the Smelting Works with thei ladies, that those who have already visited this place hav not enjoyed the trip, and soiled their dresses, and woul recommend that the trip be not made, as one lacking i interest.

It was also moved and carried that the invitation be kindly refused, as the Association has not the time to meet this engagement and fulfill those already in hand.

Mr. Craig—I move we adjourn *sine die*, and that every member present here, with his friends, meet with us at Detroit. Carried.

The Convention adjourned to meet in Detroit, Michigan, the second Tuesday in September, 1890.

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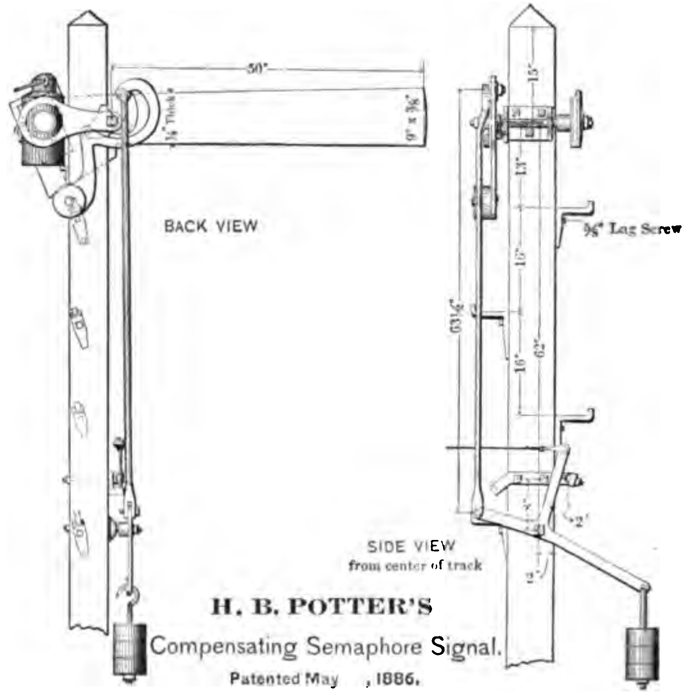
Hillburn, Rockland Co., N. Y.

Interlocked Distant Semaphore Signals

FOR SWITCHES, CROSSINGS,

Yard Protection and Station Signals.

With the Safety Switch Stand a distant signal is set at danger before the Switch can be opened (a'so when thrown by train) and must so remain until the Switch is returned to main track and locked.



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Compensating Semaphore Signal.

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This is a **Light Working Positive Signal,** whether operated with counter weight or by double line of wire. Expansion and contraction of the wire does not change the position of the target. The style of construction can be made to conform to standards on any road, and adapted to all purposes as train signals. **Successfully in use for five years.**

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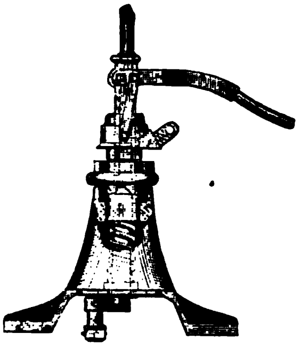
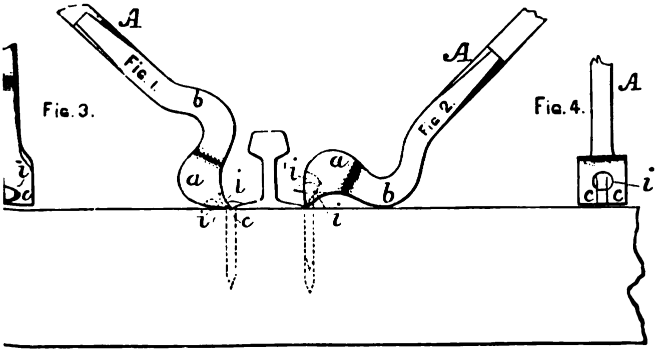


HAMM'S SPIKE PULLER.



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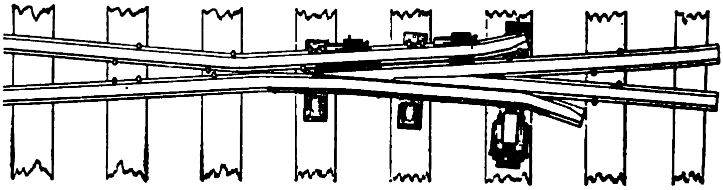
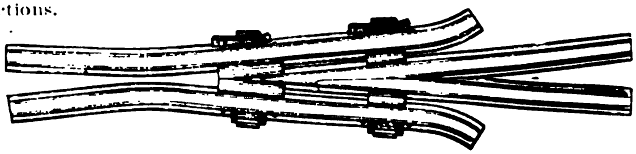
PENNSYLVANIA STEEL CO.,

STEELTON, PENN'A.



This Spring Rail Frog is claimed to surpass all others in Safety, Strength and Durability, Noiselessness and convenience of placing and maintenance. Is not expensive, and in main line tracks is the most economical Frog that can be used. The fixed parts are tightly bound together inside of strong clamps, which are so interlocked and secured that they cannot work out of place, are much stronger than any other means of fastening the parts, and may always be tightened, as the parts wear, so as to keep everything snug and solid, and avoid rattling. The spring rail is guided and kept in place by the strongest and most efficient devices in use, the spring rail being strengthened and secured against breaking. The peculiar form of the spring rail provides for all conditions of wheels the most secure and effectual bearing and support ever attained in Spring Frogs.

The special improvements relating to the Spring Rail are also applied in various patterns of Bolted and Rivet Spring Frogs for parties ordering such constructions.



The **PATENT KEYED PATTERN STIFF** Frog continues the favorite Rigid Frog, and is sold more extensively than any other pattern of Rigid Frog. It is of the strongest possible construction, simple and reliable, easy to place and keep in condition to obtain the utmost durability of the steel rails of which it is made.

STIFF FROGS, of VARIOUS RIVETED PLATE, and BOLTED PATTERNS

Are also supplied to many roads, and our facilities for making them, at favorable prices, are not surpassed. Various methods of fitting, as preferred.

CROSSING FROGS, of every required angle, are constantly produced, in large numbers; some, of the most complicated character. The constructions vary according to requirements. The materials used are always of the best quality for the purpose. All filling is the toughest soft steel, specially rolled, and the bracing is of the heaviest sort.

COMBINATION OR SPLIT CROSSING,

Such as required in making thoroughfare cross-overs over parallel tracks; made with the most convenient and durable arrangements for operating the Slip Switches; easily placed and satisfactory. Our experience in this line is extensive.

PATENT THREE-THROW SPLIT SWITCHES,

Operated wholly by one-hand Lever. Wherever it is excusable to retain three-throw switches this improvement should be used. It is justly regarded as the most satisfactory three-throw arrangement on the market, and is sold at a moderate price.

For particulars of above, address } **GEO. W. PARSONS, Supt. F. S. & S. Dept.,**
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ENNSYLVANIA STEEL CO.,

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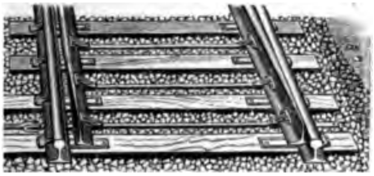

SPLIT SWITCHES

— AND —

Lorenz Safety Switches,

nade with **INTERCHANGEABLE PARTS** unsurpassed in workmanship and fit-
. Having unequalled facilities for their production, either for quantities or
ities, invite attention thereto. Have six different (standard) patterns of
truction, suited to all requirements, and make several other patterns (on
ifications). Imitations of our patented special patterns are extant, of which
public are warned. Slide plates or friction plates are Steel, and Braces of
ught Steel; both, combined, make the ideal switch plate. Switch points
d as required, and elevated as in Clarke-Jeffery Switch when required.

FIXTURES OF ALL KINDS FOR STUB SWITCHES.

IMPROVED PATTERNS OF SWITCH STANDS.

WROUGHT STEEL GUARD RAIL BRACES.

GNETO ALARM SIGNAL FOR HIGHWAY CROSSINGS.

e safety of the public is se-
d by an ample warning in ad-
e of the approach of the train,
ALL HOURS, for only a frac-
of the annual expense of *day*
hmen. It will be found to
t the requirements of the pub-
t most of the dangerous cross-
. By its use railroads may
tly limit the expense of pro-
ing highway crossings. It
NERATES ITS OWN ELECTRICITY
equired (and only by passage
rain or locomotive) by Ma-
nes of the *Magneto* type, in
ng cases alongside the tracks
quired distance from the crossing, actuated by every passing wheel which
a "tread" wider than rail, action continuing until train reaches crossing.
lly managed and kept in order. Supplied on six months' trial to roads
ring to test its reliability.

ELECTRIC SEMAPHORE SIGNALS,

Operate at any required distance with certainty and precision. Useful at all points where trains are to be signalled and controlled from a distance. Movement of signal effected by currents from magneto machines, which will operate any required number of Semaphores from the one station. The same are used in systems of **AUTOMATIC BLOCK SIGNALS**, not expensive in first cost or in maintenance. Specially advantageous for Railroads of large traffic.

For particulars, address

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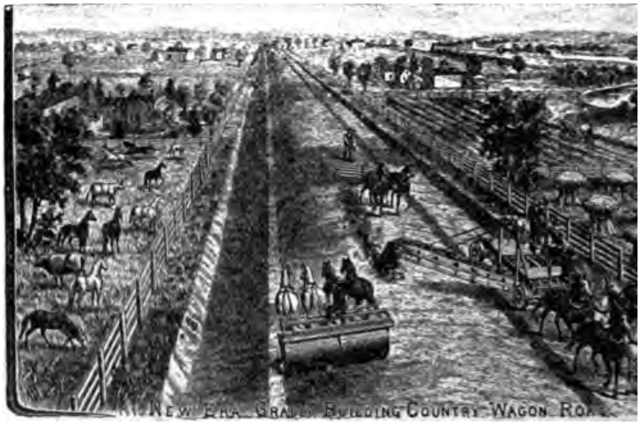
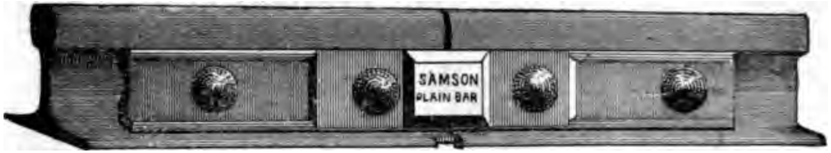


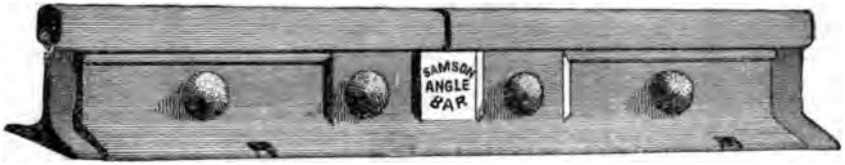
NEW ERA GRADER BUILDING COUNTRY WAGON RO

The NEW ERA Machine is *guaranteed* to ha
yards of earth, or load 600 *wagons in ten hours;* to bu
one-third of a mile of good prairie road per day, or cu
of open ditch in ten hours; to handle and place in emba
roads, Levees, or Dykes, or throw out of Ditches or C
the amount of earth for the same expense that it wo
other appliance—ordinary embankments costing from
cubic yard. No earth-moving contractor's outfit is c

Highest Prize Awarded by National Exposition of Railway Appliances, Chicago, 1883, for "Best Fish and Angle Splice Bars."



The Celebrated "SAMSON" Bar.



In use upon 160 Different Railway Companies' Tracks, in All Parts of the United States, and Under Every Variety of Service.

Having been manufactured by the undersigned (Sole Proprietors), for the past twelve years, and during which time more than **9,249,058** bars have been rolled and placed upon 160 different Railways, has demonstrated the fact that under all varieties of Railroad service they will prevent "*low joints,*" *battered rail ends,* and in a remarkable degree withstand the *test of breakage.*

We have seen a very careful report made by a large Railway Company for its own use, where 2,000 miles of track is laid with "Samson" Splices, and only 1 per cent. of breakage was recorded. In two other cases of Railways having about 700 miles each laid with "Samson" Splices, the breakage was respectively .25 of 1 per cent, and 1 per cent., as against 20 per cent. to 30 per cent. of breakage of the ordinary Angle and Plain Splices, both steel and iron. A total of 9,249,058 Bars, which, for usual length of rail, would fasten 13,137 miles of track, have been sold of the "Samson" Bar.

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MORRIS SELLERS & CO.,

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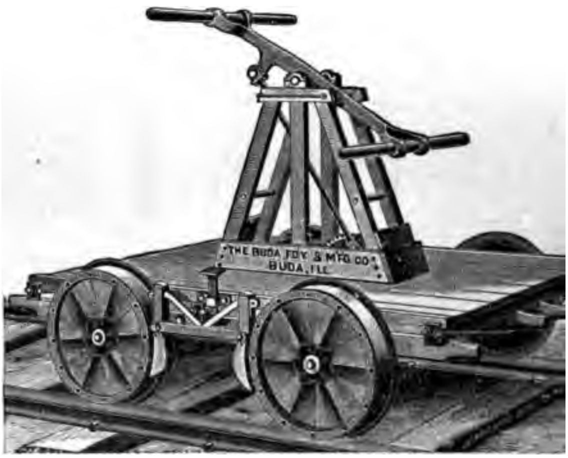
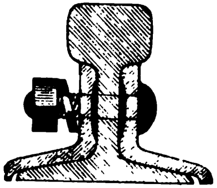
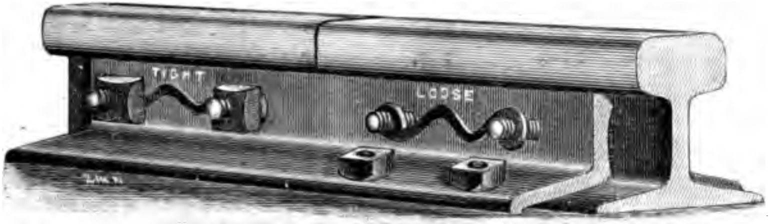
No. 6, Ashland Block, CHICAGO, ILL.

WITH ROLLED STEEL TIRE.


THE BUDA FDY. & MFG. CO.
BUDA, ILL.

RAILWAY SUPPLIES
SWITCH STANDS, -:- SWITCH FIXTI
HEAD CHAIRS.
GENERAL FOUNDRY AND MACHINE





SINGLE NUT LOCK.

THE "EXCELSIOR"
AUTOMATIC - NUT - LOCKS

OR

FISH PLATE SPRINGS.

The Cheapest, Most Durable and Effective Nut Lock Known.

☞Sample lots furnished for trial, Free of Expense, by forwarding the distance between Centres of Fish Plate Bolts. ☞CORRESPONDENCE AND ORDERS SOLICITED.

These Nut Locks have been adopted by the New England Roadmasters, in Conventions held at Hartford, Conn., October 19 and 20, 1887, and Boston, Mass., August 15 and 16, 1888, as the Best Nut Lock Known.

RUFFNER & DUNN,
PATENTEES AND SOLE MANUFACTURERS,
SCHUYLKILL FALLS, : : : : PHILADELPHIA, PA.

AMERICA'S FAMOUS SNOW PLOW.

-- THE --

"ROTARY"

— HAS —

Side-Tracked

— Every other device for —

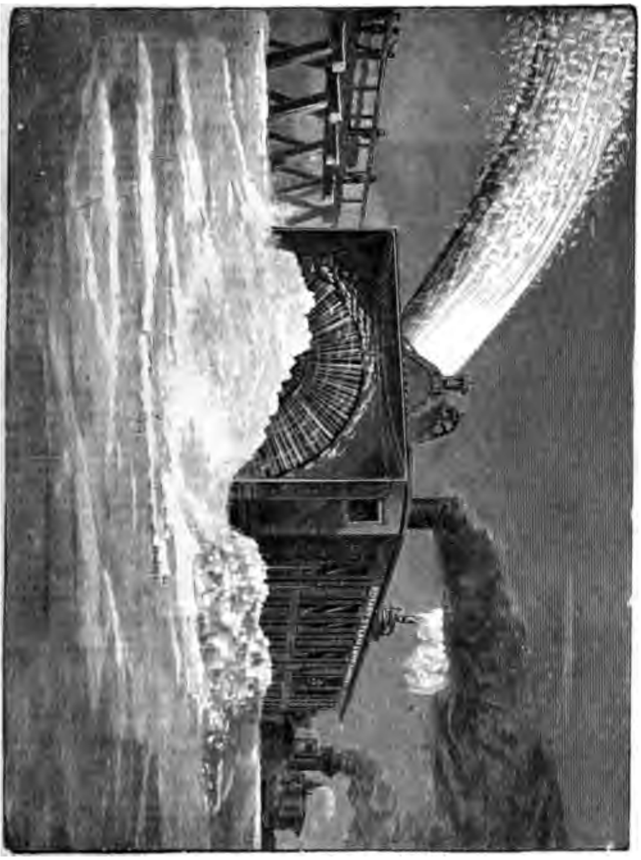
REMOVING SNOW,

Making a Clean-Sweep of All.

For Full Particulars,
Address

THE LESLIE BROTHERS MANUFACTURING CO., - PATERSON, N. J.

THE "ROTARY."



The IMPROVED ROTARY built this year by us is as much perior to the former Rotaries as they are to the old-fash-ed wedge plow, which was proved March 19th, on the uthern Pacific Road in the Cascades, California.

Every machine is guaranteed.

For full particulars, address

THE LESLIE BROTHERS M'F'G CO.,
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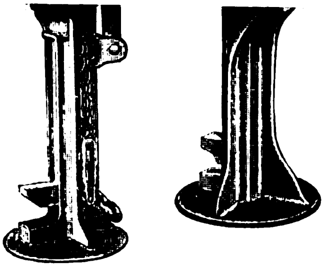
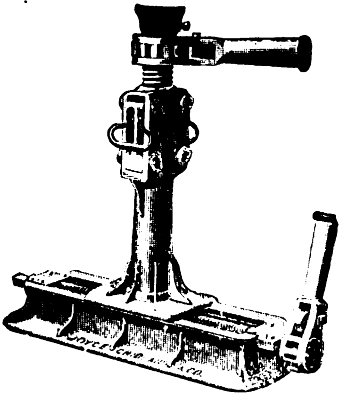


J. C

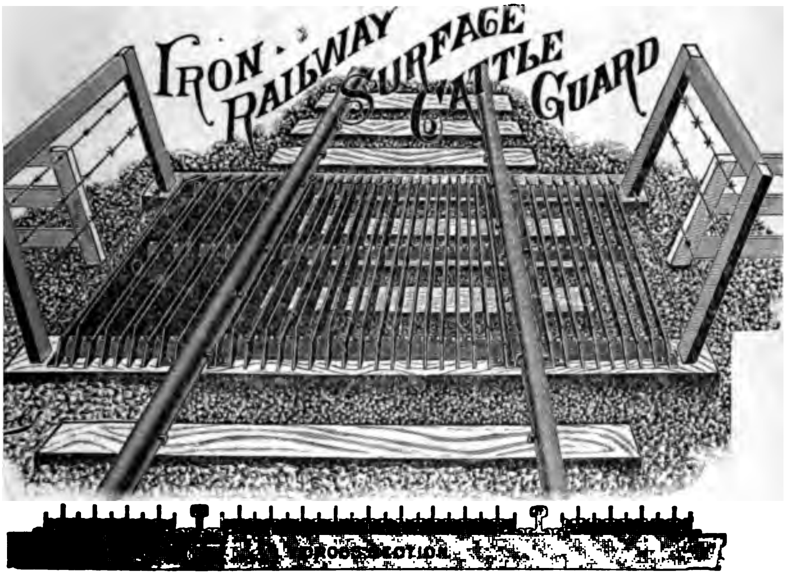
Comp


JOYCE CRID… CO.

HALL, Manager. **T. M. FISH, Secretary.**

The National Surface Guard Company,

MANUFACTURERS OF THE


Iron Railway Surface Cattle Guard
ROOF SECTION

We have recently made improvements in the

ON SURFACE CATTLE GUARD

Which warrant the assertion that we are manufacturing the

st, Safest and Most Economical Cattle Guard, No Pit Required,

xistence. This Cattle Guard was unanimously endorsed by the **lmasters'** Association of America, and by the New England Asso-**n** of Roadmasters at their last Conventions ; is

NOW IN USE ON OVER ONE HUNDRED RAILROADS

e United States and Canada, and is giving universal satisfaction.

We make this Cattle Guard any width desired, and to fit any num-**f** parallel tracks. A Single Track Guard can be placed perma-**y** in track in thirty minutes, and can be taken out in half that **h** of time. Full instructions for placing the Guard in track are with each order.

orrespondence and orders respectfully solicited. Address

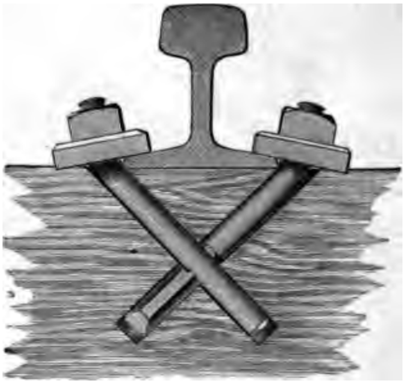
The National Surface Guard Co.,

284 SOUTH CLARK STREET.

1 Pacific Hotel Block. **CHICAGO, ILLINOIS.**

THE BUSH INTERLOCKING BOLTS

Make Your Bridges and Curves



Absolutely Safe and Secure.

—— An absolute ——

SAFETY ❋ DEVICE

For preventing Railroad Rails from

SPREADING AND CREEPING,

And Derailment of Trains from Broken Rails.

IN ✶ USE ✶ ON ✶ THIRTY ✶ DIFFERENT ✶ ROADS,

And approved by some of the most prominent
Railroad Officials in the country.

For Price List and Descriptive Circulars, address

THE BUSH INTERLOCKING BOLT CO.,

133 South 4th Street. **PHILADELPHIA, PA.**

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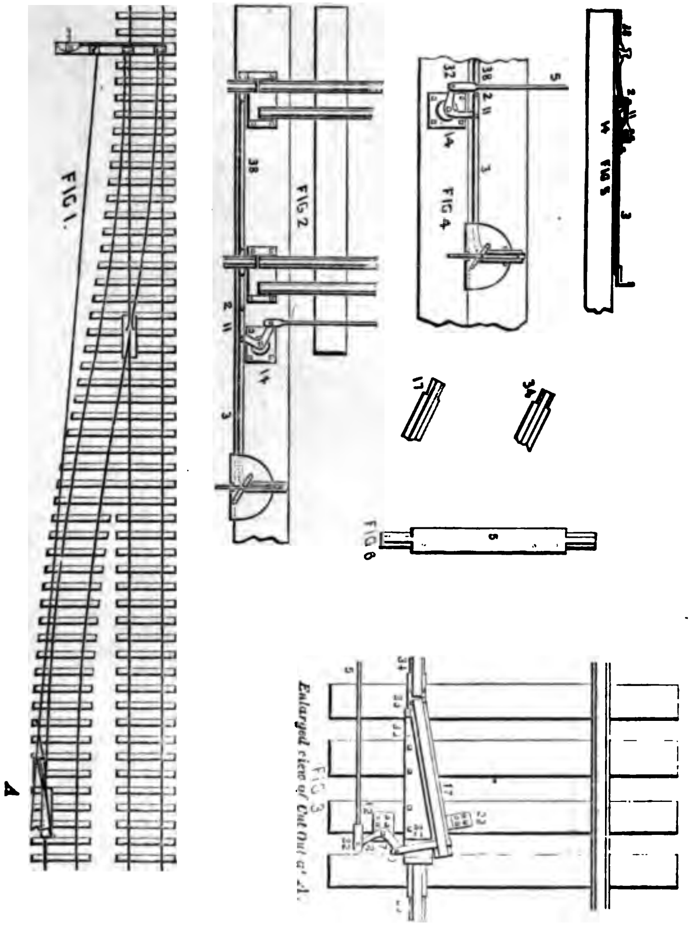
HE DAILEY AUTOMATIC "CUT-OUT" SWITCH



perfect protection against fouling of the main track by side-tracked cars. Not subject to human fallibility.

Manufactured only by the

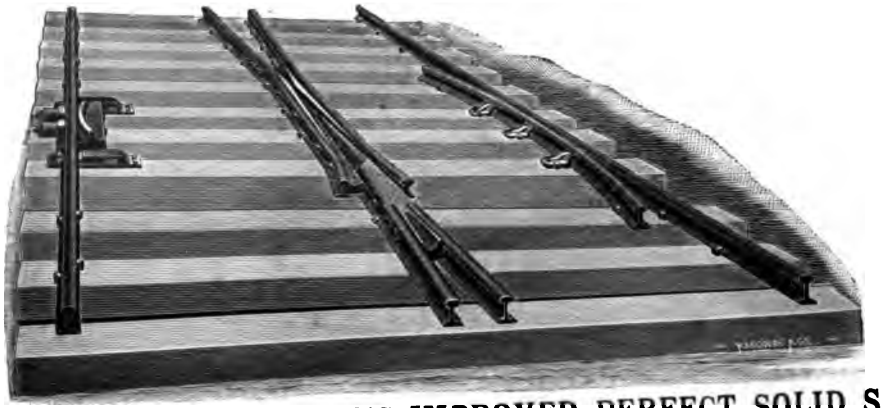
SHEFFIELD VELOCIPEDE CAR CO.,

Three Rivers, Michigan.

☞ Also Manufacturers of the most perfect Section Hand Cars in use.

The Campbell Solid Steel Frog and Railroad Crossing Works,

BUCYRUS, OHIO.



Manufacturers of All Kinds of

STEEL ∴ RAIL ∴ FROGS,

WROUGHT IRON ROTARY TARGETS

And SWITCH STANDS.

Christie's Patent Claw-Bar,

Improved Rail and Slide Rail Braces,

SPIKE HAMMERS,

STRIKING HAMMERS,

— AND —

Track Tools of All Kinds.

CAMPBELL'S IMPROVED PERFECT SOLID STEEL FROG

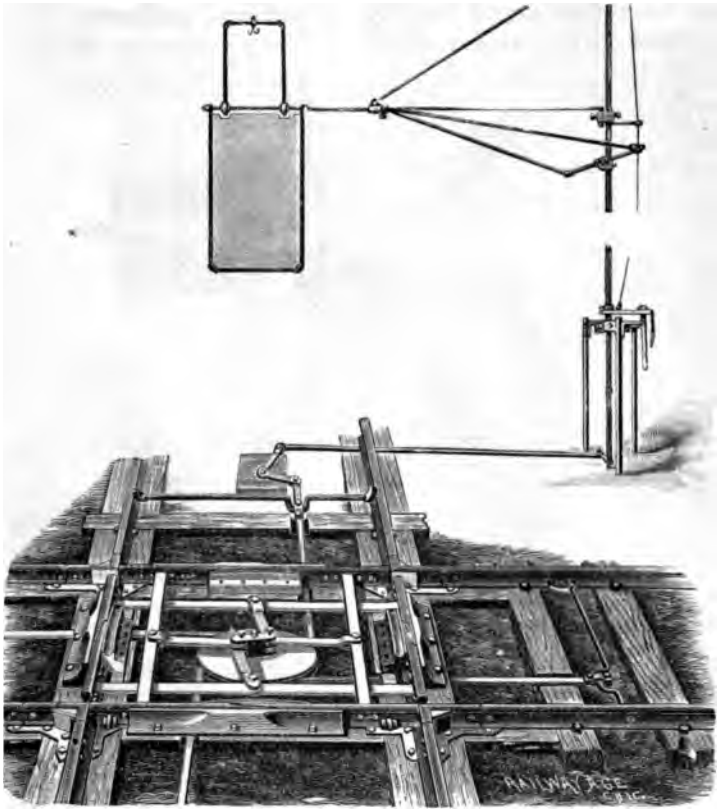
Is a positive footguard, not only complying with the State laws, but doing away with wooden blocks and cinder fillings. Being solid steel and even with the rail, it protects wing rails and bolts, and dispenses with the need of trackmen. It is self-cleaning at all seasons; is guaranteed to outwear **SIX** ordinary rail frogs; rides as smoothly as the main track, and prolongs the life of frog-ties fifty per cent. A spring guard rail is substituted for the long ridged boot-jack guard rail, which adjusts itself to any wheel; prevents breaking and bending of axles or loosening of wheels.

G. R. CAMPBELL, Bucyrus, Ohio.

'HE CAMPBELL SOLID STEEL FROG

AND

Railroad Crossing Works.



RAILWAY AGE CHIC.

Campbell's Patented Railroad Crossing

thrown into position by the target, or automatically by the engine wheels osing the flangeways on one track and opening them on the other, giving the ad that has the target or train a solid rail. This device prevents the pound d jar from the corners, and makes the crossing ride as smoothly and noisessly as any portion of the track.

G. R. CAMPBELL,
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ELLIOT FROG & SWITCH CO.,

East St. Louis, Illinois,

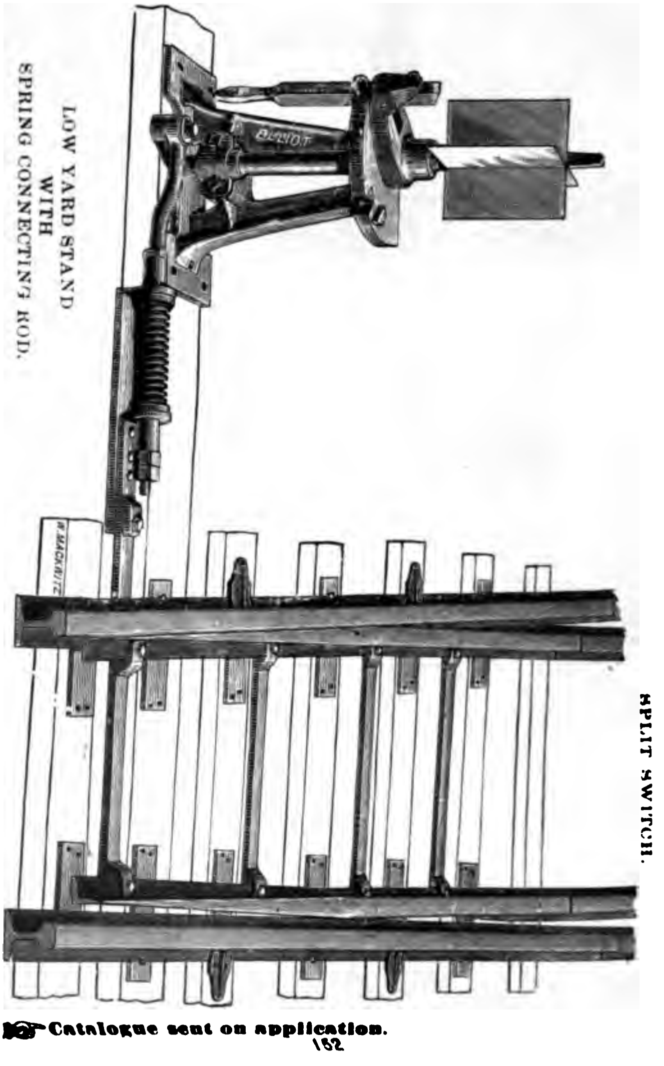
MANUFACTURERS OF

RAILROAD FROGS, CROSSINGS, SWITCHES,

VARIOUS PATTERNS OF

Switch Stands

And Every Description of Railroad Iron Work.



☞ Catalogue sent on application.

LLIOT FROG & SWITCH CO.,

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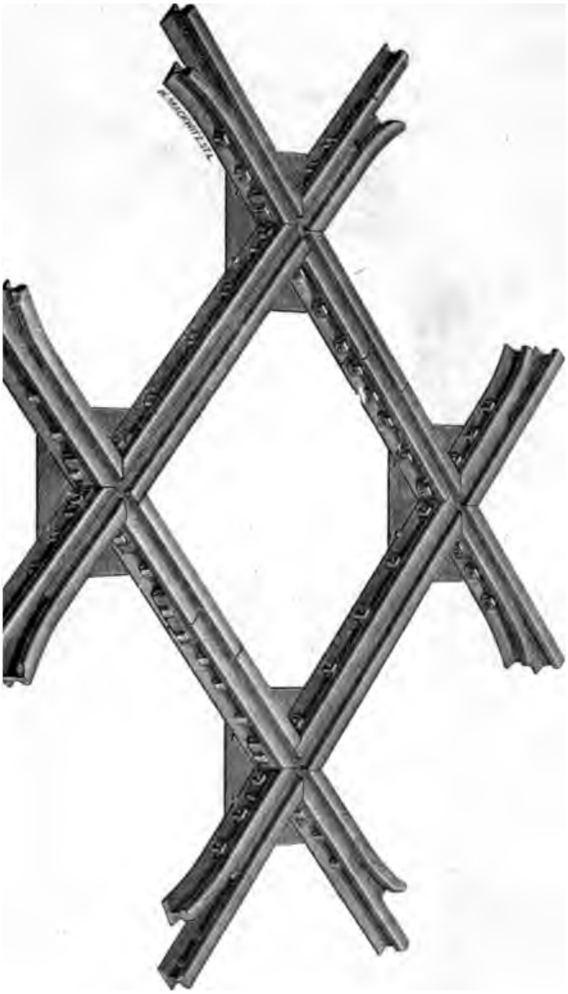
Stiff Rail Frogs and Crossings

with Solid (Welded) Wrought Iron or Steel Frames, and olts Used are of the Very Best Charcoal Iron.



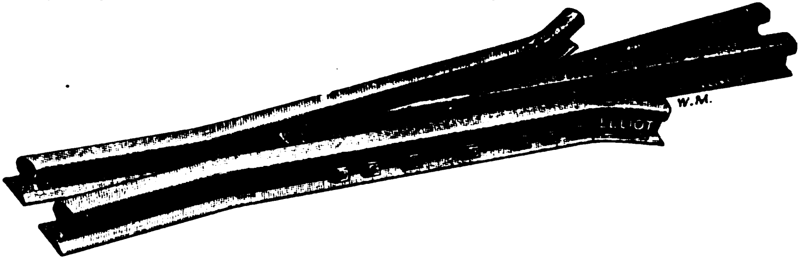
All Sections and Weights of Rail Carried in Stock.

Our Capacity Enables Us to Fill Orders Promptly.

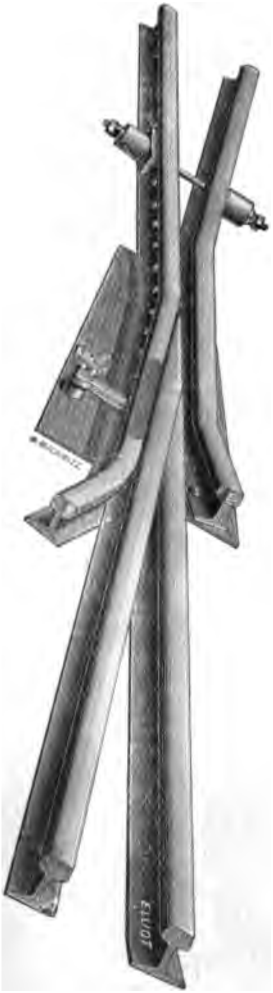
ELLIOT FROG & SWITCH CO.,

East St. Louis, Illinois,

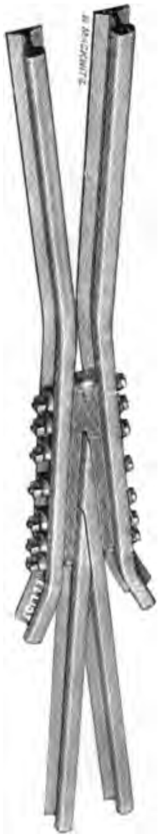
Spring Rail Frogs, Split Switches, Lap and Stub Switches.



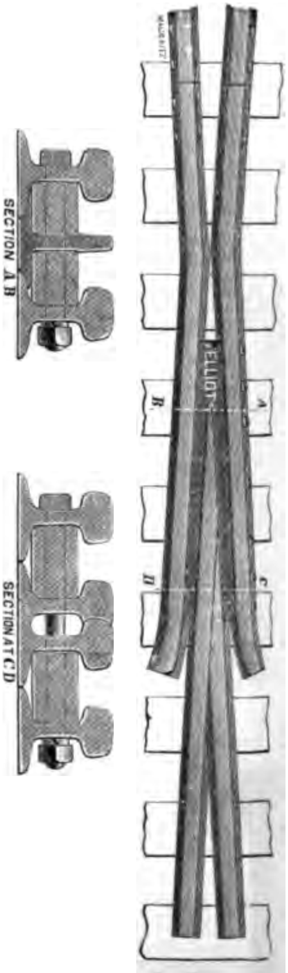
MAIN LINE FROG.



SPRING RAIL FROG.



STIFF RAIL FROG.



Frogs and Crossings Made Any Angle or Length Required.

LLIOT FROG & SWITCH CO.,
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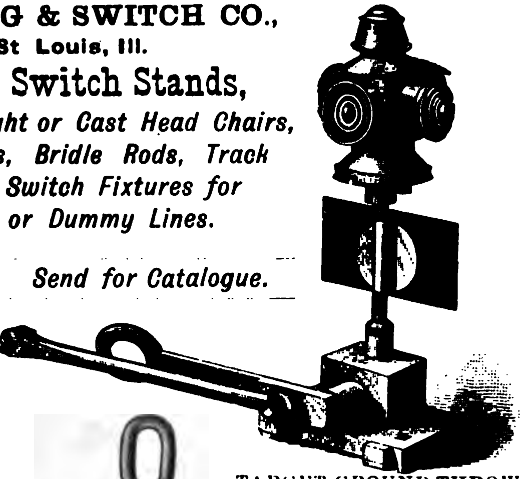
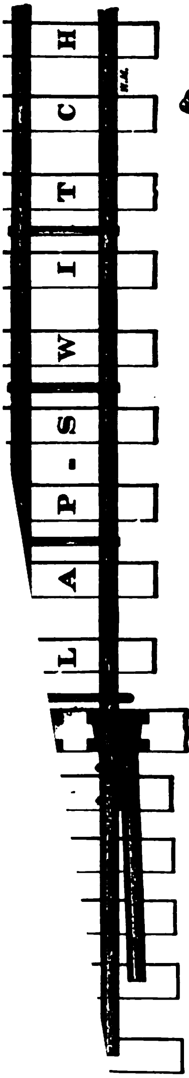
Automatic Switch Stands,

l Braces, Wrought or Cast Head Chairs,
eplacing Frogs, Bridle Rods, Track
Tools, Passing Switch Fixtures for
Street Car or Dummy Lines.

Send for Catalogue.

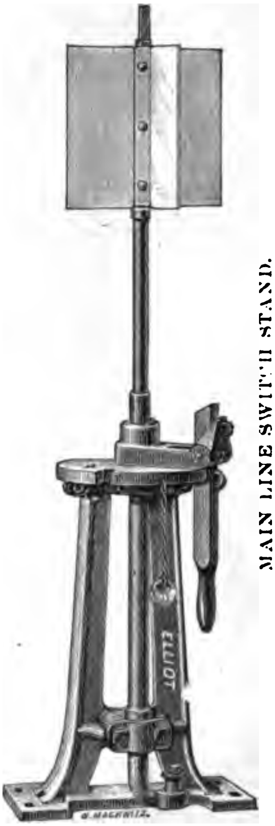


TARGET GROUND THROW



HORIZONTAL GROUND THROW.

STUB RODS.

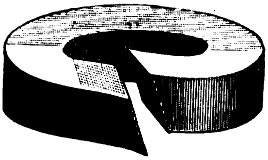


MAIN LINE SWITCH STAND.

Estimates and other Information Furnished.

The Verona Nut Lock for 1890.

160,000,000 IN USE.



Improved in Proportions,

Increased in Strength,

Reduced in Price.

A tempered cast steel spring, with smooth bearing surfaces and hardened engaging points. For use on track bolts. Takes up wear. Locks the Nut. Quality fully maintained

We manufacture a large line of SOLID STEEL TRACK TOOLS of best approved models and reliable quality.

Price-list on application. Inquiries cheerfully answered.

METCALF, PAUL & CO.,

Seventh Ave. and Liberty St.,
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The ROBERT W. HUNT CO.

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Inspection, Tests and Consultation.

INSPECTION of Rails, Fish Plate, Cars and other Railway Materials. Chemical and Physical Laboratories.

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Robert W. Hunt, *M. Am. Soc. C. E., M. Am. Inst. M. E., M. Am. Soc. M. E., late Gen. Sup. Troy Steel and Iron Co.* JOHN J. CONE, *Engineer of Tests;* G. W. G. FERRIS, *C. E.;* JAMES C. HALLSTED, *C. E.;* A. W. FIERO, *Insp'g Engineer;* D. W. McNAUGHER, *C. E.;* WM. F. GRONAU, *C. E.*—Northwestern Agents for Riehl Bro.s' Testing Machines.

THE WEIR FROG CO.

Manufacturers of the Most Complete Line of

* Track Supplies, *

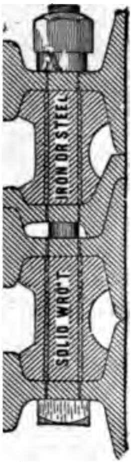
And have the largest capacity of any similar concern West of the Alleghany Mountains.

WORKS: Front, Smith and Water Sts., CINCINNATI, OHIO.

In the list of their manufactures may be mentioned Six Styles of Rigid Frogs, Eight Styles of Spring Frogs, the well-known Clarke-Jeffery Split Switch with F. C. Weir's Improvements, Crossings, etc., illustrations of a few of which are shown herewith.

First, we desire to call the attention of the Roadmasters to our Rigid Frog, which is shown in cut, and Cross Sections, cuts 1 and 2. Cross Section of which shows our Specially Rolled Solid Steel or Wrought Iron Filling process. These Frogs are secured with 7/8 Through Bolts, the Widest National Lock Washer Company's Nut Locks, and Hex Nuts, making a very strong and durable job.

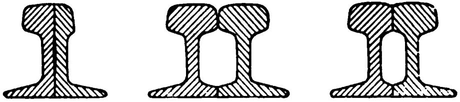
There having been some discussion as to the merits of the different methods of constructing points of frogs, we have concluded to show them all up, believing there will be but one conclusion by the level-headed, practical trackmen.



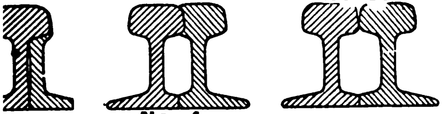
No. 2.

No. 1.

nt Cross Sec-
No. 3 shows
inal method
maki'g points
rogs by not-
ng the main
nt rail to receive short point rail.

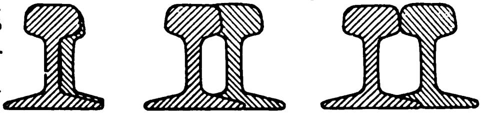


No. 3.



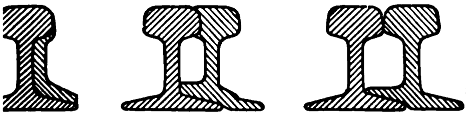
No. 4.

Cut No. 4 shows the first improvement on this, by which the head of the main point rail was preserved but the
weaken-
Cut No. 5
ws the full
ength of
main
nt rail pre-
ved, but at
cost of



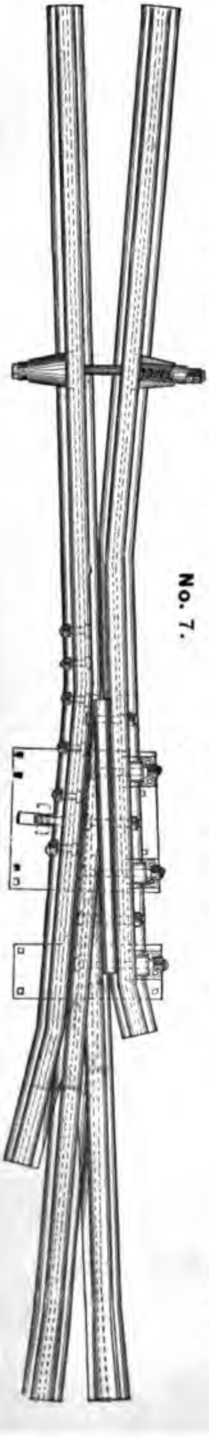
No. 5.

very materially weakening the short point rail, so that it has a very slim vertical support. Cut No. 6 shows the latest improvement, which is the WEIR system, manufactured and controlled exclusively by us. This is what we term Die-Formed Short Point. By this method we not only save the full strength
e main point rail, but more of the original strength of the short point rail,
produce a stronger construction of the point rails generally.

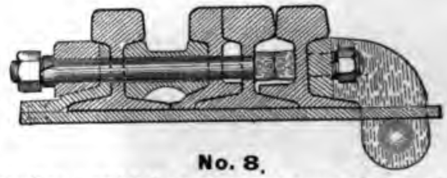


No. 6.

These cross section cuts are fair illustrations photographed down from full-
l drawings, therefore they can be unhesitatingly accepted as correct.



No. 7.



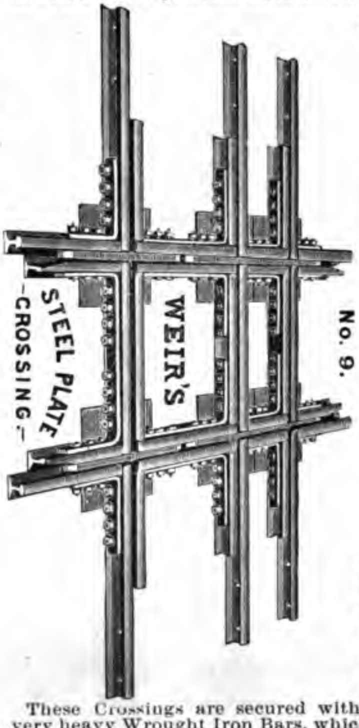
No. 8.

Cuts Nos. 7 and 8 show plan and cross section of one of our designs of Spring Frogs, which are on ½-inch Steel Plates. The Combined Holding-down and Spring-Wing Protection Device, it will be observed in Plan and Cross Section, is formed of one piece, of best Wrought Iron fitted to the shape of the Rail, made extra heavy, with a strong arm forged to it, which passes down through the Steel Bed Plate. Through the bottom of this arm is secured a Friction Roller to reduce the friction of the Spring-Wing Rail.

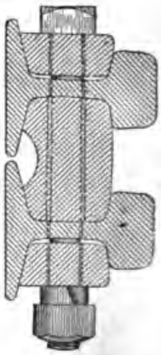
This heavy Protection Bar, it will be observed, is secured to the web of the Rail with ¾-inch Bolts either way from the extreme point of the Frog, and this insures the holding together of the Rail in the event of its being broken, and thereby avoiding an accident.

For the above reasons we believe this to be the most efficient and durable Spring Frog in the market.

Besides this, we are making five other designs, some lower priced and some more expensive, but we feel confident that we can suit anyone, no matter what his ideas are. Blue prints of these different designs will be furnished on application.



No. 9.



No. 10.

Our Crossings, made with specially Rolled Solid Wrought Iron or Steel Filling, as shown by Cut No. 9, and Cross Section No. 10, are very extensively used.

These Crossings are secured with specially Rolled very heavy Wrought Iron Bars, which, with the use of eighty or more Through Bolts, ⅞ of an inch in diameter, Hex Nuts, the Widest National Lock Washer Company's Nut Lock, produce the strongest and most durable structure possible; and being supported on Steel Plates at each corner, the durability of not only the Crossing, but also the Ties is assured, without impairing the elasticity.

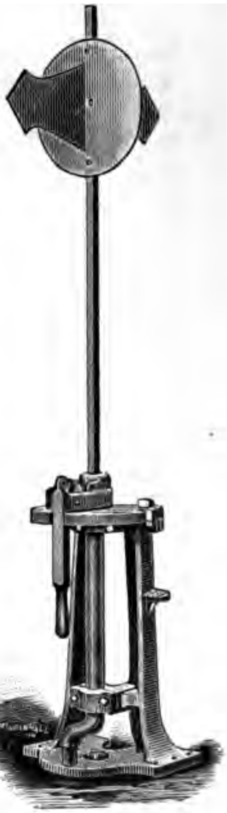
We show our patent Three-Throw Split Switch with patented Low Target
round Throw Stand by cut No. 11. This Switch presents many new and valu-
ble features, and in Yards when Three-Throw Switches are sometimes a ne-
essity, we can especially recommend it as being safer, more durable, and easier
n the rolling stock than any Switch now in use. The Stand, which throws the
witch by means of a single lever, is the only Low Target Ground Throw Stand
r Three-Throw Split Switches in the market, and as a Ground Throw Stand is
esirable in Yards, we feel that we have a Stand
pecially adapted to the purpose. The fasten-
gs which connect the Rails and Bars are the
me as those used on our Single Split Switches.
., Steel and Die Formed. They come nearer
absolutely unbreakable fastening than any
w in use. The opening through which the Bar
sses is large enough to permit considerable
teral movement of the Bar, which allows the
witch Rails to move more freely.

Our Steel combined Brace and Friction Plates
sed with these have no equal, as they are inde-
tructible, and we alone have the right to fur-
ish them. All of the Friction Plates of this
witch are Steel, and all of them pass through
nder both Main Track and Split Point Rails,
that an equal bearing is always insured on
oth the Main Track Rail and Friction Plates.

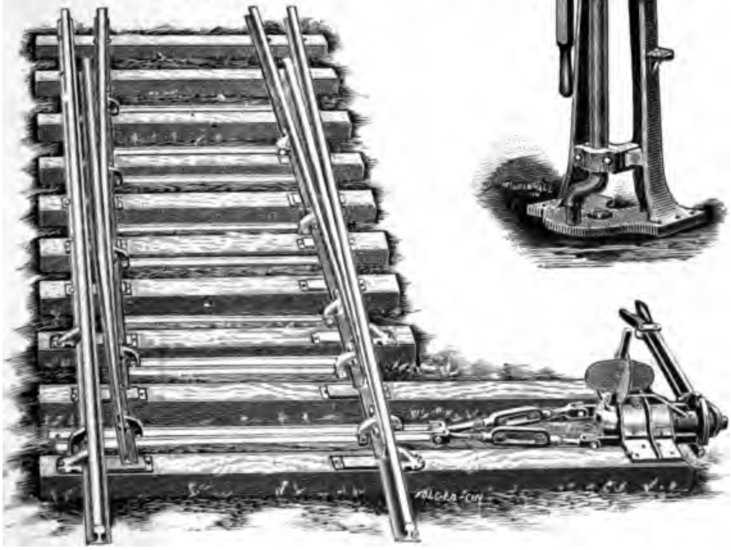
Our capacity for furnishing these Switches is
ractically unlimited.

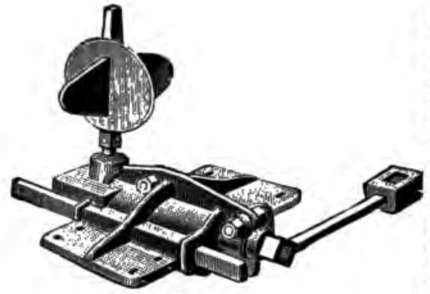
Our High Switch Stand, shown on cut No. 12,
what we term our Union Pacific Pattern; pos-
esses the merit of not permitting tampering
ith the Connecting Rod when it is once put on
its place and the Crank Shaft bolted up, as
he Bottom Plate under the Stand prevents re-
noval. The Locking Device in the Lever Cast-
ng at the top of the Stand is very simple and
ery effective, as will be seen by the cut. We
nake this pattern that we term High Stand, and
lso a Pony Stand, which is not more than half
ts height, with any style of Target as desired.

No. 12.



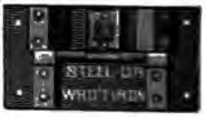
No. 11.





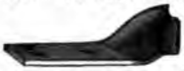
No. 13.

We also have another **Switch Stand that we term our Automatic Low Target. This is shown by** cut No. 13. **It is very positive in** its motion, **and a very durable** Stand. **It can be used with either** Stub or Split Switch, **but is automatic only with** Split **Switches,** when trailing through them. **We have furnished large numbers of** these with excellent **satisfaction.**



No. 14.

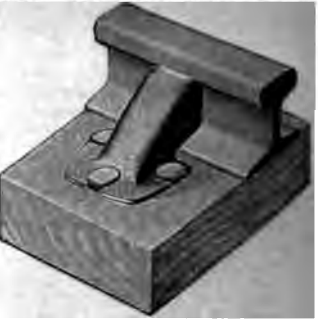
Cut No. 14 illustrates **our Open Hearth Steel Plate Head Chair. These are so well-known that it is hardly necessary to make any** remarks as to their merits, but it may not be generally understood that because of using Steel Plates we are enabled to preserve the elasticity of the Switch Joint, and thereby prolong the life of the Switch Rails, as well as furnish a Head Chair that will outlast any other in the market. We are furnishing these in car-loads, which alone is sufficient as to their merits.



No. 15.

Cut No. 15 is a Wrought Iron Rail Brace made by **this** Company, and gotten up to supersede the old style Cast Iron ones that are usually chunks, yet are easily broken in spiking and from other causes.

Die-Formed Steel Rail Brace.



No. 16.

We have recently designed and patented an improvement on the Wrought Iron Brace, which is shown in cut No. 16. This Brace is made of Steel, and Die-Formed *to fit any Section of Rail*. It has a bearing on the side of the head of the Rail, and also on the Web just under the Head. It is positively indestructible in spiking, or in any other way. It is the cheapest Steel Brace in the market, not only as regards first cost, but also because of its durability. We have made hundreds of thousands of these Braces since it has been on the market. One of the leading Roads has about twelve car-loads **in use on their line.**

We call especial attention to our new design of **Combination Crossing or** Slip Switch with Duplex Throwing Device (see cut No. 17). **Two Rods are used** for throwing the Switch Points (hence the name Duplex), **which are operated** by one double-acting Stand. These Rods move **simultaneously in opposite directions,** and work double toggle joints which **throw the Switch Points. Turn-Buckles** are provided so that the Rods can be **readily adjusted to give the required** throw of Switch Points. We are the first **to place a longitudinal moving** Rod or Shaft in the centre of the device between **the Tracks, and thus relieve** the Yards and Tracks of such obstructions **The movement of this device is** positive, accurate and easy, and is shown worked **with one Stand. These Combination** Crossings can be made either angle—7 degrees **and 10 minutes, 8 degrees** and 12 minutes, or 9 degrees and 32 minutes—**but the No. 7 Combinations,** angle 8 degrees and 12 minutes, is considered the best, **inasmuch as it fulfills the** requirements of a Crossing and a Turn-out with **equally satisfactory results.**

IN MAKING ORDERS FOR

Frogs. Switches. Crossings or Head Chairs.

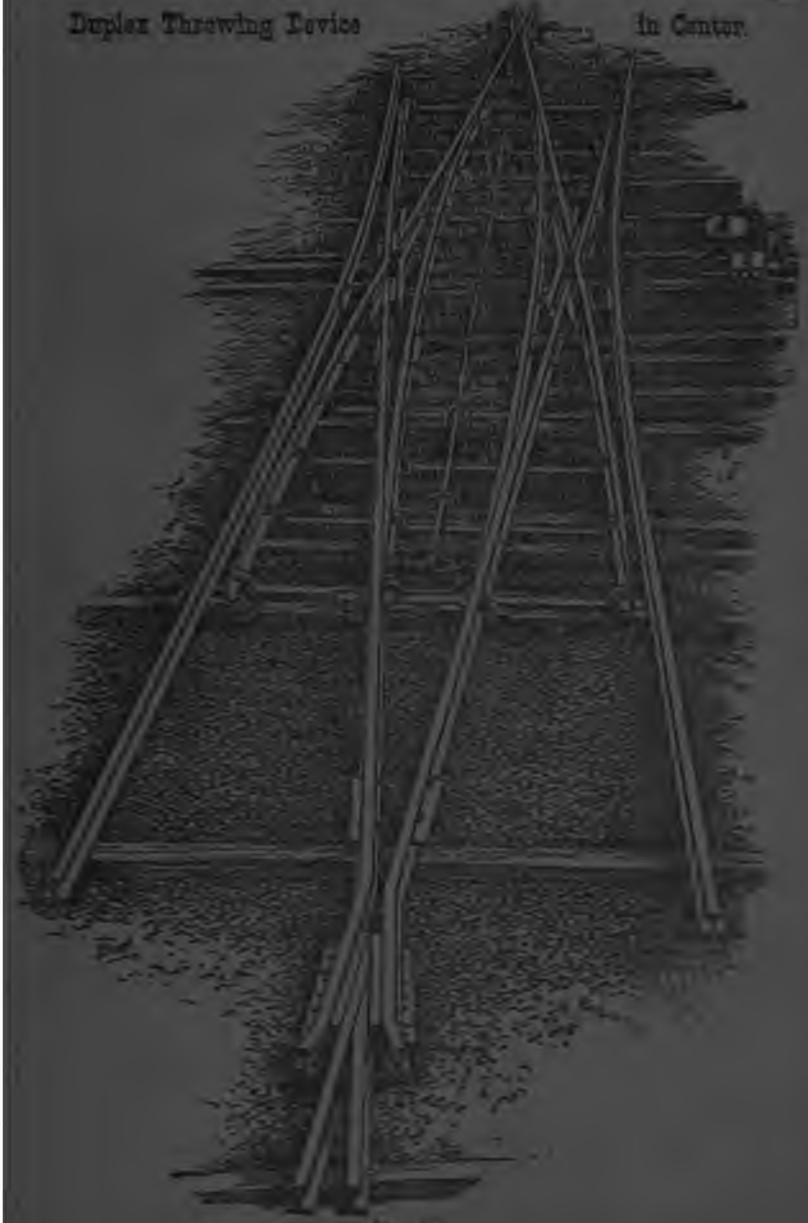
The section of Rail should be furnished. giving height and weight, distance of Fish Plate holes, guage of Track, and angles of Frogs or Crossings. Blue prints are requested for any or all of this work whenever they can be furnished. Promptness is guaranteed in filling orders, as well as good workmanship. Estimates, also Lithographs and Photographs furnished on application. Address

THE WEIR FROG CO.,

Front, Smith and Water Sts. **CINCINNATI, O.**

The Weir Frog Co.'s Combination Crossing.

Duplex Throwing Device in Center



No. 171.

Manuf

FROGS, CROSSINGS

Patent Steel Rail Br

PROCEEDINGS

OF THE

Eighth Annual Convention

OF THE

Roadmasters' Association

OF

AMERICA,

HELD AT THE

Michigan Exchange Hotel, Detroit, Mich.,

SEPTEMBER 9, 10 and 11, 1890.

Edited by the Secretary.

RUSHVILLE, IND.:
The Republican Co., Printers and Binders.
1891.

PENNSYLVANIA S

STEELTON,

STEEL RA

Of All Patterns, from Twelve Pounds per Yard to t

Steel Splices and Fa

FROGS AND CR

The special improvements in Frogs
made solely by this Company, are used
ards" on very many of the most impor
country, and they give always the best

SPLIT OR POINT

The most perfect and approved pattern
interchangeable parts, workmanship and materials

SWITCH STANDS and SWITCH FIXTURE

Rail Braces of Wrought Steel, for Curv

ELECTRIC SEMAPHOR

Operated Reliably at Any Rigu

Useful at all points where trains are to be
from a distance. Movement of signal effe
pole machine, which will operate any n
phores from the one station. The
steel Semaphore arms, mounted o

HIGHWAY CROSSING A

Magneto Electric, W

The action of the Alarm is effect
by very compact, strong, and sub
Machines of the *Magneto* type, f
which are placed alongside the tr
from the crossing.

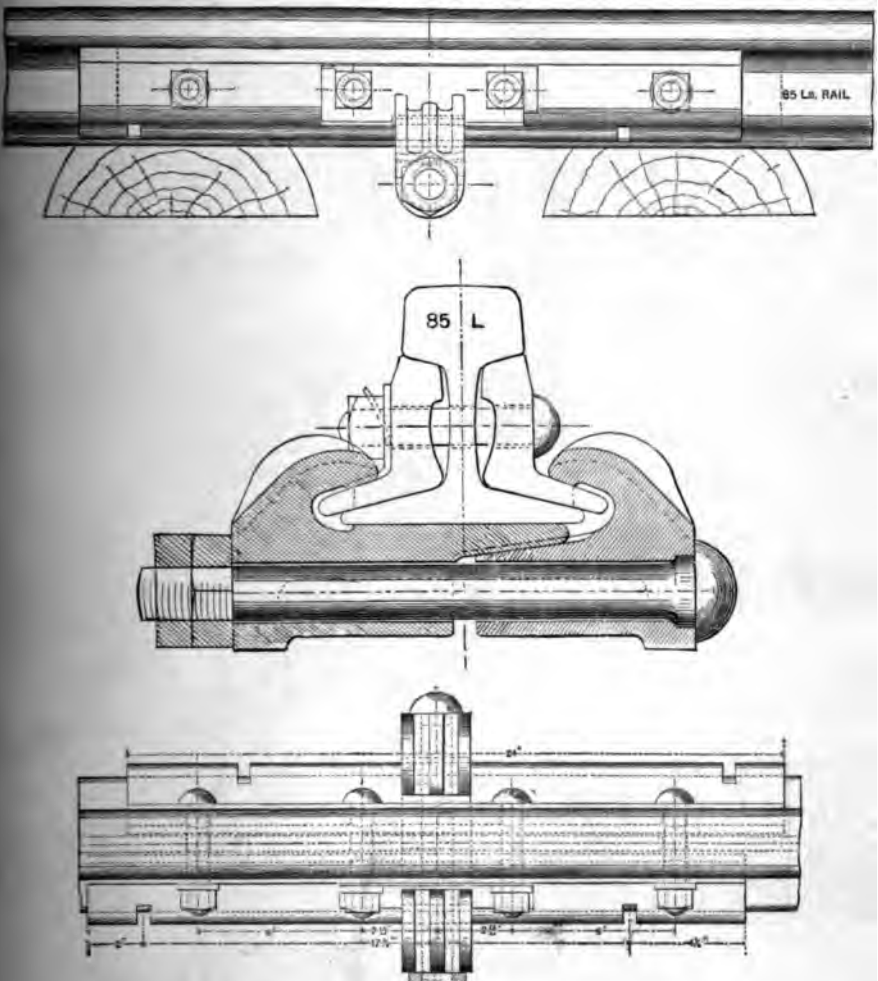
"These generators have a train of gearing, with fly
a powerful spring combination, by a lever which stan
flanged the rail, so as to be depressed by every pa
"tread" wider than the rail; producing an action w
train arrives at the crossing.

This Signal Generates Its Own Electricity

As required, and only by passage of train or locomotive. As no cells batteries are used, there is no freezing in Winter, and no materials are required to maintain the signal, except oil for lubrication. Requiring only a small amount of attention and care to keep in order, is justly regarded as the most reliable signal in use and thoroughly efficient for the protection of Highway Crossings.

CONTINUOUS RAIL JOINT

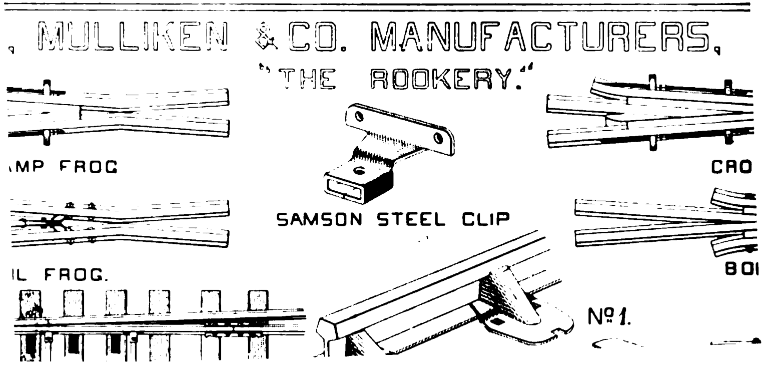
Patented.

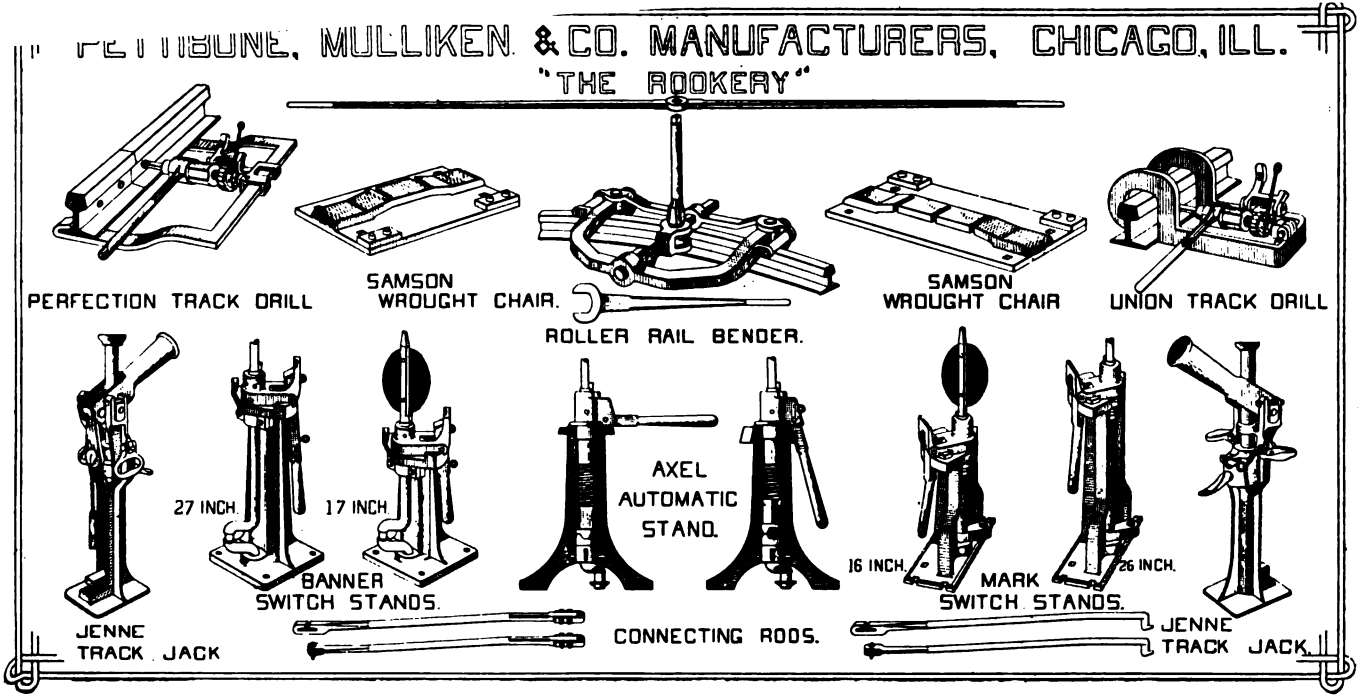


MANUFACTURED BY

The McCONWAY & TORLEY CO.

PITTSBURGH, PA.

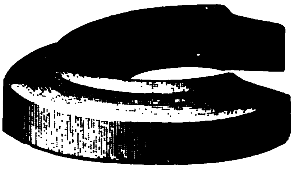

MULLIKEN & CO. MANUFACTURERS,
"THE ROOKERY."
AMP FROG
CRO
SAMSON STEEL CLIP
BOI
IL FROG.
Nº 1.


PETTIBONE, MULLIKEN & CO. MANUFACTURERS, CHICAGO, ILL.
"THE ROOKERY"
PERFECTION TRACK DRILL
SAMSON WROUGHT CHAIR.
ROLLER RAIL BENDER.
SAMSON WROUGHT CHAIR
UNION TRACK DRILL
JENNE TRACK JACK
27 INCH.
17 INCH.
BANNER SWITCH STANDS.
AXEL AUTOMATIC STAND.
16 INCH.
26 INCH.
MARK SWITCH STANDS.
CONNECTING RODS.
JENNE TRACK JACK.

THE

NATIONAL

LOCK WASHER.



SIMPLE, EASILY APPLIED.

Combining Strongest Spring Fastening possible, with positive locking of Nut by **rib.**

Can be used on any make of bolt or nut, in any place in track.

Same bolt, nut and washer can be used as **often as required.**

The National Lock Washer is made of steel, hardened and tempered in oil; when in use in track the rib is imbedded in nut (does not cut out metal in nut), thereby upsetting metal of nut and forcing it around bolt, and so locking nut that it cannot jar loose, acting at same time it has all the spring-holding power of the best spring nut lock made.

A trial of the **National Lock Washer** is requested, as actual use will demonstrate its superiority.

Samples furnished free of expense.

THE NATIONAL LOCK WASHER CO.,
93 Mechanic Street,
NEWARK, N. J.

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Patent Steel Rail Bra

INDEX TO SUBJECTS.

DDRESSES— PAGE.

President John Sloan 9
J. W. Craig .... 10 & 67
G. W. Bishop 10
John Doyle 11

OLL-CALL 12-22

OMMUNICATIONS—

H. S. Pingree 10
Charles Melville 23
F. D. Swan 30
MENDMENTS TO THE REPORT OF THE DENVER CONVENTION. 23
UBJECTS FOR DISCUSSION 26

EPORTS—

Nut Locks, Track Bolts and Spikes 30
Track Joints 35
Best Method of Instructing Section Laborers. etc .... 38 & 66
Interlocking Switches 50
Best Method of Preserving Cross-Ties 71
On Resolutions 80
ROLL OF VISITORS 81
ELECTION OF OFFICERS 82
SELECTING PLACE OF NEXT MEETING 86
APPENDIX 87
CONSTITUTION AND BY-LAWS 88

NEXT ANNUAL CONVENTION,
MINNEAPOLIS, MINN.,
Second Tuesday in September, 1891.

INDEX TO ADVERTISEMENTS.

SWITCHES, FROGS, CROSSINGS, ETC. PAGE.
- The Weir Frog Co. .... 116, 117, 118, 119, 120 and 3d page of cover
- Pennsylvania Steel Co. .... 2d page of cover and 96, 97
- Elliot Frog & Switch Co. 110, 111, 112, 113
- Ramapo Iron Works 95
- Ajax Forge Co. .... 4th page of cover
- Pettibone, Mulliken & Co. 2

RAIL JOINTS, NUT LOCKS, ETC.
- The Weber Railway Joint Manufacturing Co. 100
- Long's Truss Rail Joint Co. 105
- McConway & Torley Co. 1
- Fisher Rail Joint Works, ½ page 107
- Dunham Manufacturing Co. .... colored insert between pp. 84 and 85
- National Lock Washer Co. 4
- Noble Washer—The A. French Spring Co., Limited, ½ page 99
- Ruffner & Dunn 101
- Bush Interlocking Bolt Co. 106
- Verona Nut Lock—Metcalf, Paul & Co., ½ page 114

HAND CARS, TOOLS AND IMPLEMENTS.
- Rotary Snow Shovel—Leslie Bros. Manufacturing Co. 102, 103
- Kalamazoo Railroad Velocipede and Car Co. 108
- Joyce, Cridland & Co. 104
- Pettibone, Mulliken & Co. 3
- Ramapo Iron Works 95

STEEL RAILS.
- Pennsylvania Steel Co. .... 2d page of cover

RAILWAY SIGNALS.
- The Johnson Railroad Signal Co. 94
- The Hall Signal Co. 115
- Pennsylvania Steel Co. 97

RAILROAD SPIKES.
- Dilworth, Porter & Co. 98
- Dunham Manufacturing Co. .... colored insert between pp. 84 and 85

SURFACE GUARDS.
- Kalamazoo Railroad Velocipede and Car Co. 109

WATER COLUMNS AND TANK VALVES.
- John N. Poage, ½ page 99

BUREAU OF INSPECTION, TESTS AND CONSULTATION.
- The Robert W. Hunt Co., ½ page 114

RAILWAY NEWS.
- Engineering News and American Railway Journal, ½ page 10

Proceedings of the Eighth Annual Convention

OF THE

Roadmasters' Association of America,

HELD AT THE

Michigan Exchange Hotel, Detroit, Mich.,

September, 9th, 10th and 11th, 1890.

The Roadmasters' Association of America assembled in convention at 10 a. m., in the Michigan Exchange Hotel, in the city of Detroit, Michigan, on the 9th day of September, A. D. 1890, pursuant to adjournment at Denver, Colorado, on the 12th day of September, A. D. 1889.

President John Sloan called the convention to order in the following language :

Gentlemen of the Roadmasters' Association of America: You will please come to order. When we adjourned one year ago at Denver, Col., we adjourned to meet at Detroit, Mich., on the second Tuesday of September, 1890. That time now having arrived, you will consider yourselves in order, ready for business.

Since the adjournment at Denver, we have had many changes, pleasant and otherwise. Some have been inevi-able, and we must meet them as they come. I hope we ill all enjoy ourselves while here.

The Mayor was expected to meet us here, but he writes at he can not be present. The Secretary will please read e communication.

Thereupon the Secretary read the letter of regret of Mayor Pingree, which letter was as follows:

CITY OF DETROIT, EXECUTIVE DEPARTMENT,
September 8, 1890.

W. H. Courtney, Vice President Roadmasters' Association:

DEAR SIR—Being otherwise imperatively engaged, I shall not be able to attend the opening of your national convention.

I wish to say, however, that your Association has my best wishes for its continued prosperity and its growth in usefulness. These good things, I take it, cannot fail to come from the annually recurring interchange of ideas and experience which your convention brings about.

Upon the excellence of the road-beds of our great trunk lines largely depends the easy interchange of our products, the quick transmission of our mails, and the safe and rapid transit of persons desiring to go from one part of this great country to another. Upon the fidelity with which the Roadmasters perform their work we are largely dependent for what we read; for what we wear; for what we eat; for our own personal safety, and for that of those dear to us.

As such important factor in the well-being of our country, I bid you welcome to Detroit—a city which I sincerely trust and believe you will find a pleasant one to spend a few days within.

Very respectfully,
H. S. PINGREE, Mayor.

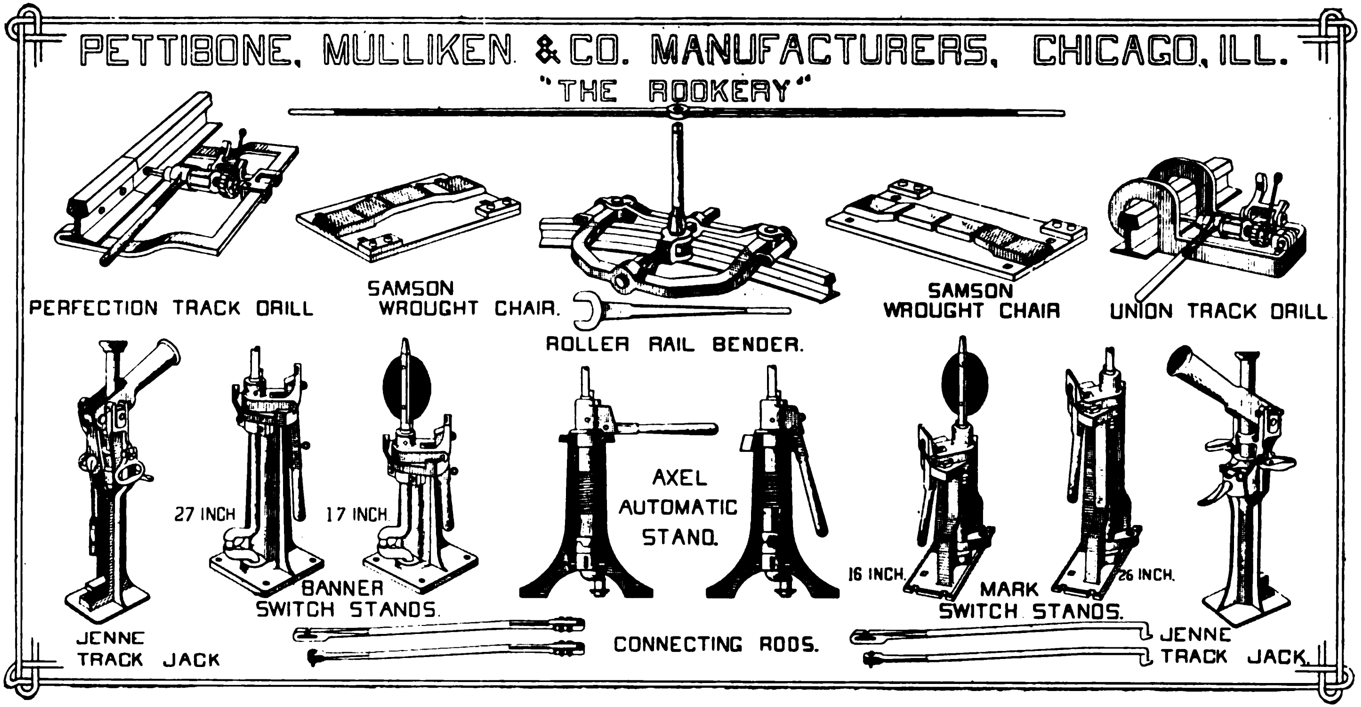
By consent the letter was accepted and placed on file.

The President—Our honorable ex-President, J. W. Craig, being present, I would be glad to hear from him in response to the communication of Mayor Pingree.

J. W. Craig—*Mr. President and Gentlemen of the Convention:* I would respond very cheerfully, had I not an address which I hope to present later on in the proceedings. I am, however, very happy to so many Roadmasters and ladies present to-day. This is my first visit to Detroit. It is a very beautiful city. I am sorry I am not a resident of it. I hope we will all enjoy our trip.

The President—I notice Mr. G. W. Bishop, President of the Roadmasters' Association of New England, is with us. We would be happy to hear from him.

G. W. Bishop—*Mr. President, Ladies and Gentlemen:* This is a thorough surprise to me. However, I do not know that I could do better were I prepared. It is certainly a very



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"THE ROOKERY"

PERFECTION TRACK DRILL

SAMSON WROUGHT CHAIR.

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BANNER SWITCH STANDS.

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MARK SWITCH STANDS.

JENNE TRACK JACK.

CONNECTING RODS.

27 INCH
17 INCH
16 INCH.
26 INCH.

with kind hearts and a broad Michigan welcome which comes from the heart of a progressive people. Such is the welcome you will receive while in the State of Michigan.

Michigan, one of the most beautiful in our great Union, extending from the broad Atlantic to where the Pacific washes the sands of the golden shores of California—Michigan, my Michigan! Bounded by her beautiful lakes, blessed with pure, wholesome air, domed by a beautiful blue sky, lighted by heaven's stars, upon whose altar we worship good health, good wives, beautiful daughters and brave sons —wishes you all prosperity and bids you a hearty welcome. [Applause.]

The President—The next thing in order will be the calling of the roll.

The Secretary called the roll as follows:

NOTE.—Names marked with a dagger † indicate that such members were present. Addresses marked with an asterisk * indicate the correct address of the member; those unmarked are the last known addresses.

NAME.	NAME OF ROAD.	ADDRESS.
†Adams, A. B	Wabash	*Peru, Ind.
Adams, Thomas	B. & O	*Connellsville, Pa.
Alexander, John T	Georgia Pacific	Atlanta, Ga.
Archer, G. M	S., F. & W	Waycross, Ga.
Atherton, L. E	C., B. & K. C	Moulton, Iowa.
Ayer, George E	A., T. & S. F	*Trinidad, Col.
Bailey, Isaac	Wabash	Cowles, Neb.
Bartlett, Daniel	K. C., St. J. & C. B	*St. Joseph, Mo.
Baxter, R. W	S. P. Coast	Alameda, Cal.
†Barrett, P. W	L. & H	*Warwick, N. Y.
Bates, W. G	D. & S. F	Pueblo, Col.
Barry, John	Bishopville	*Atkins, S. C.
Baker, Z. W	Fall Brook Coal Co	*Wellsboro, Pa.
Ball, Austin	St. L., I. M. & Southern	*Charleston, Mo.
Bennett, George	C., M. & St. P	*Janesville, Wis.
Beauprie, W. R	M. & C	Tuscumbia, Ala.
Benson, J. A	Augusta	*Augusta, Ga.
†Bentley, H. H	Barclay (Leas'd by Erie)	*Towanda, Pa.
Bernard, Thomas	R. & D	*Columbia, S. C.
†Bishop, George W	Fitchburg	*Athol, Mass.
Blue, A. P	E. T., V. & G	Atlanta, Ga.
Blaine, A. L	L. S. & M. S	Hillsdale, Mich.
Blanton, S. T	R. & D	*Batesburg, S. C.

Robert	Manhattan Elevated	*71 Broadw'y, New York.
. F	Illinois Central	*Jackson, Tenn.
Duncan	Canadian Pacific	*Rat Portage, Ontario.
an, E. A	Union Pacific	*Golden, Col.
Mat	Central Iowa	Ackly, Iowa.
James	D., B. C. & A	*East Towas, Mich.
B. F	O. & M	Flora, Ill.
, George M	F. & P. M	*East Saginaw, Mich.
E	Union Pacific	Rawlins, Wyo.
S. H	C. & N. W	*Belle Plains, Iowa.
W. F	W. & L. E	East Toledo, Ohio.
T. J	Union Pacific	Denver, Col.
Robert	St. L., A. & T	*Malden, Mo.
B	Wisconsin Central	Stephens Point, Wis.
William A	C. & N. W	*Sparta, Wis.
J. W	Northern Pacific	Frankfort, Ind.
t, I		*Joliet, Ill.
John	Illinois Central	*Pontiac, Ill.
C	C., S. Fe & C	Streator, Ill.
I. A	C., M. & St. P	Redwing, Minn.
M. F	Union Pacific	Boulder, Col.
in, J. H. K	G. R. & I	*Grand Rapids, Mich.
l, J. W	F. C. & P	*Jacksonville, Fla.
J. T	Southern Pacific	*Harwood, Tex.
hs, B. M	F. C. & P	*Jacksonville, Fla.
Hugh	L., N. A. & C	Bloomington, Ind.
eorge E	St. L. Merch. Bridge Co.	*St. Louis, Mo.
J	N. & P	Jamestown, N. Dak.
ell, G. R	Toledo & Ohio Central	*Bucyrus, Ohio.
D	B., C. R. & N	*Watertown, S. Dak.
, W. E	Ft. W. & R. G	*Dublin, Tex.
Richard	Lehigh Valley	*Whitehaven, Pa.
C	Illinois Central	Le Mars, Iowa.
Dennis	O. & M	*North Vernon, Ind.
, S. T	E. & W	Cartersville, Ga.
y, T. S	A., T. & S. F	*Topeka, Kan.
, A. S	Fitchburg	Fitchburg, Mass.
V. G	U. P	Denver, Col.
. C	Housatonic	*Falls Village, Conn.
V. E	Ver. Val. & Sullivan Co.	*Charleston, N. H.
ey, W. H		*Detroit, Mich.
C. H	C., M. & St. P	Dubuque, Iowa.
J. H	N. Y. C. & St. L	*Bellevue, Ohio.
ank	C., R. I. & P	*Des Moines, Iowa.
n, W. J	C., M. & St. P	Mason City, Iowa.

Conley, P. J.	St. L., A. & T.	*Pine Bluff, Ark.
Connell, M.	A., T. & S. F.	Newton, Kan.
†Collom, Jacob	L. S. & M. S.	*Monroe, Mich.
Crippin, J. A.	C., R. I. & P.	Des Moines, Iowa.
†Craig, J. W.	C. & S	*Charleston, S. C.
Cronin, Thomas	Int. & Gt. N.	*Palestine, Texas.
Crowly, William	A. & P.	*Williams, Ariz.
Cummings, John	Canadian Pacific	North Bay, Ont.
Cuyler, C. H.	C., B. & I.	Galesburg, Ill.
Curry, John	C., M. & St, P.	Yankton, Dak.
Davis, Garrett	B., C. R. & N.	*Riverside, Iowa.
Daley, P. W.		McComb, Ohio.
†Davey, E. C.	K. C., F. S. & M.	*Springfield, Mo.
Davies, Collin A.	L. & N.	*Birmingham, Ala.
Daley, M. R.	W. N. & P.	Buffalo, N. Y.
†Daggett, G. E.	N. Y., N. H. & H.	*Stamford, Conn.
DeCourcy, John	Southern Pacific	*Houston, Tex.
DeWitt, O. S.	C. & N. W.	Wall Lake, Iowa.
Delaney, F. D.	Union Pacific	Cheyenne, Wyoming.
Diddle, W. G.	C. & O. R.	*Olney, Ill.
Divine, M. W.	A. C. L.	*Wimington, N. C.
Dickens, F. A.	Southern Florida	*Giant Mills, Va.
†Dickson, J. B.	Penna. Co.—C. & P.	*Wellsville, Ohio.
Dinan, John	Lehigh Valley	*South Bethlehem, Pa.
Diddle, A. J.	C., C., C. & St. L.	*Indianapolis, Ind.
†Doyle. John	D., L. & N.	*Grand Rapids, Mich.
Downing, G. W.	N. P.	Little Falls, Minn.
Donavan, J.	C,, St. P. & K. C.	Dubuque, Iowa.
Doom, John P.	L. & N.	*Middlesborough, Ky.
Donnahoo, W. J.	C., R. I. & P.	Iowa City, Iowa.
Dodson, John A.	G., C. & N.	Monroe, N. C.
Dorsey, John	N. & P.	*Coeur d'Alene, Idaho.
Dorsey, E. J.	Lehigh Valley	Perth Amboy, N. J.
Dobbins, Patrick	D. & S. P.	Denver, Col.
Doty, F. R.	Illinois Central	Amboy, Ill.
Drury, E. G.	C., M. & St. P.	Marion, Iowa.
Duncan, Samuel M.	C., M. & St. P.	*Cedar Rapids, Iowa.
Dwyer, Thomas	M., L. S. & W.	Weyerhaeuser, Wis.
Edwards, E. P.	C. & N. W.	Sterling, Ill.
†Elliott, Dan	A., T. & S. F.	East Las Vegas, N. Me
†Ellis, William F.	P. & W.	*Woonsocket, R. I.
Erbey, W.	C., L. & N.	Kennedy, Ohio.
Erickson, L.		*Corsica, Ohio.
Feeney, John	A., T. & S. F.	*East Las Vegas, N. Me
Fitzgerald, Thomas	Shenandoah Valley	Sheperdtown, W. Va.

Finn, J. D	N. P	Livingston, Mont.
Fitzpatrick, T	S. P	Sierra Blanco, Texas.
Fisher, E	M. C	St. Thomas, Ont., Can.
Fitzgerald, J. M	W. & W	Wilson, N. C.
Flynn, Luke	C. & N. W	Carroll, Iowa.
Floriet, V. D	Mexican National	City of Mexico.
Foreacre, W. W	Georgia Pacific	*Douglasville, Ga.
Forbes, J	R. & N. M	Lordsburg, N. M.
Foley, M	B. & O	Rockwood, Pa.
†Freeland, A. N	W. C. & A. C	*Sumpter, S. C.
†Galarneaux, F. K	C., L. & N	*Lima, Ohio.
Galvin, J. T	O. C	Grant's Pass, Ore.
Gallagher, M	M., L., S. & W	Saxon, Wis.
Gaffney, John	St. L., Ft. S. & W	Eldorado, Kan.
Gaunt, James M	Mo. Pacific—M., K. & T.	Waco, Texas.
Gaunt, Robert	I. & G. N	*Houston, Texas.
Garrison, DeWitt C.	S., L. & N	*Roxbury, Conn.
Geddes, James K	B., Z. & C	*Zanesville, Ohio.
Gilhooly, M	C. & O	Ronceverte, W. Va.
†Gilchrist, J. B		*Denver, Col.
Gillispie, A. J	R. & N	Richmond, Va.
Glenn, Pat	U. P	*Tekoa, Wash.
Gogarty, Pat	N. & P	Billings, Mont.
Godsey, J. N	R. & D	Newberry, S. C.
Gregory, W. H	C., M. & St. P	Monticello, Iowa.
Gregg, R. D	I., I. & I	Kankakee, Ill.
Griffin, M. J	N. Y. W., S. & B	Detroit, Mich.
Grogan, John	Southern Pacific	Houston, Texas.
Grove, D. E		*Dallas, Texas.
Gray, N. A	C., B. & Q	Villisca, Iowa.
Gross, G. W	C. & S	*Ridgeland, S. C.
Green, Frank W	Canadian Pacific	*Brandon, Manitoba
Granburg, H. O	N. P. R. R	Forsythe, Mont.
†Hayward, Joseph	K. C., St. J. & C. B	*St. Joseph, Mo.
Hammond, C. P	R. & D	*Birmingham, Ala.
Hart, A. G	Southern Pacific	*Ogden, Utah.
Happersett, H. E	Oregon & California	Ashland, Oregon.
Hall, James M	L. & N	*La Grange, Ky.
Harley, A	A., T. & S. F	Emporia, Kan.
†Hanover, H. D	O. & M	*Aurora, Ind.
Harrison, G. W	C., S. & M	Montgomery, Ala.
Hawkins, A. M	Norfolk Southern	*Berkley, Va.
Hamill, James	D. & R. Y. W	Salt Lake, Utah.
Hallahan, J. T	Texas Pacific	Gretna, La.
Heister, W. A.	N. Y., L. E. & W	*Buffalo, N. Y.

Hickey, Thomas	C., R., I. & P	*Geneseo, Ill.
†Hickey, Timothy	M. C	*Jackson, Mich.
†Hildebrand, J. D	A., T. & S. F	*Chanute, Kan.
Hickey, Charles	D. & Rio G	*Gunnison, Col.
Hildebrand, D	A., T. & S. F	*Ottawa, Kan.
†Houghton, R. A	Wabash	*Defiance, Ohio.
House, F. E	C., M. & St. P	*Chillicothe, Mo.
Houghton, H. H	L. S. & M. S	*Elyria, Ohio.
Houghton, Geo. B	L. S. & M. S	Norwalk, Ohio.
Houghton, Geo. A	L. S. & M. S	*Andover, Ohio.
†Howe, P	B. C. R. & N	*Estherville, Iowa.
Howes, L. C	U. P	*Sterling, Col.
Houlehan, John	A., T. & S. F	Ottawa, Kan.
Hutchison, H	B., N. Y. & P	Olean, N. Y.
Hutchins, J. C	L., N. O. & T	Memphis, Tenn.
Hutchinson, William	Boston & Maine	Nashua, N. H.
Hyland, R	Fitchburg	*Keene, N. H.
Hyland, C. A	Cheshire	Keene, N. H.
Jacobs, P. H	C. & N. W	Winona, Minn.
Jackson, J. M	Mer. Br. Tr	*St. Louis, Mo.
†Jones, C. E	C., B. & Q	*Beardstown, Ill.
†Jordon, O. F	M. C	*St. Thomas, Ont.
Jolly, J. S	Florida Southern	Rochelle, Fla.
Johnson, O	Canadian Pacific	*Manitoba, Man., Can-
Kelly, P. J	C., St. L. & C	Kankakee, Ill.
Kelly, M. D	St. P. & D	*St. Paul, Minn.
Kelly, J. B	N. P	*Mandan, N. Dak.
Keller, C. B	C., C., C. & St. L	*Cambridge City, Ind-
†Kerwin, J. A	C. & N. W	*Madison, Wis.
Kearns, John	Chicago & Alton	*Springfield, Ill.
Kellett, J	Canadian Pacific	Medicine Hat, Assiniaboia, Canada.
†Kindelan, Joseph	C., M. & St. P	*Mitchell, S. Dak.
Kinney, John	C., M. & St. P	Oxford Junction, Iowa
Kitel, E. R	C. & N. W	Chicago, Ill.
Kirby, James	Southern Pacific	*Eagle Lake, Texas.
Kidd, J. I	Cleveland & Marietta	*Cambridge, Ohio.
Lavoix, Charles	B., R., B. & L	Winthrop Junction, N
Lamb, J. F	S. F. & W	*Thomasville, Ga.
Laughlin, J. O	C. & E	*Huntington, Ind.
Larison, W. T	St. L., K. & N. W	Hannibal, Mo.
Lane, J. S	N. Y., N. H. & H	Hartford, Conn.
Lehman, C. A	A., T. & S. F	Ft. Madison, Iowa.
Lewis, Geo. W	R., G. & S	*Durango, Col.
Lee, W. F	C., R., I. & P	*Des Moines, Iowa

Lee, Thomas	Rio G. West	*Salt Lake City, Utah.
Linsley, J. H	C., B. & Q	Galesburg, Ill.
Lovell, D. H	Pennsylvania	*Harrisburg, Penn.
Loftus, P. H	C. & N. W	Milwaukee, Wis.
Lockie, Geo. J	N. C. & O	*National City, Cal.
Lynch, Pat	C., C., C. & St. L	Urbana, Ill.
Lynch, James	U. & P	Spokane Falls, W. T.
Lyons, Henry	A., T. & S. F	Kiowa, Kan.
Mayer, J. A	S., T., P., M. & M. Gt. No.	*Great Falls, Mont.
Massey, V. M	Northern Pacific	Spokane Falls, Wash.
Mahoney, D	O. & M	Olney, Ill.
†Mallard, Charles C	Southern Pacific	*Algiers, La.
Madigan, Thomas J	T., St. L. & K. C	*Charleston, Ill
Mandeville, J. O	Lehigh Valley	*Hazleton, Pa.
Manning, W. T	Staten Island	*New York, N. Y.
Maloney, M. J	F., C., C. M	*San Luis, Mex.
Markham, C	C. & W. M	Holland, Mich.
Marvin, C. E,.	Cent. R. R. & B'nk'g Co. of Ga.,	*Macon, Ga.
†Merrill, G. W	C., M. & St. P	*Savannah, Ill.
Melville, Charles	G., H. & S. A	*Glidden, Texas.
†Meade, J. M	A., T. & S. F	*Topeka, Kan.
Mitchell, C. F	C., M. & St. P	*Mazo Manie, Wis.
Mirriam H. B	U. P	Buena Vista, Col.
Minturn, R. R	C., M. & St. P	*Tomah, Wis.
Molynex, M	G. C. & San F	*San Antonio, Texas.
Morris, T. O	C., I., St. L. & C	*Indianapolis, Ind.
Moore, H. C	N. Y. & N	*High Bridge, N. Y. City.
Moore, J. Willis	S. F. & W	Thomasville, Ga.
Moore, G. B	A., T. & S. F	Great Bend, Kan.
†Morrisey, W	A., T. & F	*Topeka, Kan.
Mulcohy, Edw	C., W. & M	Elkhart, Ind.
Mulvey, James		
Mullane, R. D	C., N. O. & T. P	*Somerset, Ky.
Mullen, Thomas J	C., M. & St. P	*Wabasha, Minn.
Mungavin, P. J	Northern Pacific	Ashland, Wis.
†Murtaugh, B		Jersey City, N. J.
McAvoy, A	L. R. & M	*Brinkley, Ark.
McBride, James	St. L. & C. I	*Chesterfield, Ill.
†McCarthey, J	St. L. & S. F	*Springfield, Mo.
†McCarthey, D	J., T. & K. W	*Palatka, Fla.
McCormick, M. D	K. C., W. & N. W	*Kansas City, Kan.
McCaffery, Charles	Southern Pacific	Sierra Blanco, Texas.
†McCoy, R. Z	A., T. & S. F	*Emporia, Kan.
McDonough, M	I. & G. N	*Palestine, Texas.
McDonald, Frank	C., B. & Q	*Savannah, Ill.

McInerny, M	M., K. & T	Parsons
McKeon, P. W	D., L. & W	Leicest
McKinzie, L. U	Wichita & Western	*Kingn
McLeod, A. L	St. L., I. M. & S	*Little
McMahan, P	U. P	Ellis, K
McManama, J. W	Fitchburg	North
McNulty, W. H	A., T. & S. F	*El Pa
McQuiston, J. C	Cin., Geo. & Ports	Cincinn
McQuaid, J. H	Oregon Pacific	Yaquin
Newcomb, G. B	North Eastern	Floren
Neher, C. R	W. N. Y. & Pa	*Roche
Nelligan, W. D	A., T. & S. F	*Kiowa
Neale, J. M	C., K. & N	*Wichi
Neale, J. M	C., K. & N	Herrin
Nilson, C. L	O. P	———,
Nolan, P	Alabama & Gt. Southern	*Birmi
Noble, F. A	C. & P	*Sudbu
Offutt, G. W	Long Island	*Long
O'Boyle, J	D. & R. G	Montro
O'Brien, W. G	Norfolk & Western	Bluefie
O'Leary, D	K. & W	Center
O'Neil, Dennis	Pa. & N. Y. C. & R'y Co	Auburn
†O'Neil, P	B., C. R. & N	*Iowa
Payne, W. T	Northern Pacific	Tacom
Palmer, Martin	F. C. & P. Co	*Wald
Parker, P. J	A., T. & S. F	*Newto

n, J. H	C., R. I. & P	Des Moines, Iowa.
ce, G. H	L. S. & M. S	*Painesville, Ohio.
ell, M	P., C., C. & St. L	*Columbus, Ind.
ty, Thos	C., M. & St. P	*Lanesboro, Minn.
r, T. N	T., S. & M	*Greenville, Mich.
sey, John P	Ft. W, C. & L	*Muncie, Ind.
f, W. R	S., F. & W	Waycross, Ga.
l, H. W	S., F. & W	*Waycross, Ga.
r, M	Vandalia	Effingham, Ill.
, Philip	L. V	Tunkhannock, Penn.
rds, O. D	L. S. & M. S	*Toledo, Ohio.
, Wm	Chicago & Alton	*Bloomington, Ill.
e, John	U. P	
an, J. J	I. & G. N	Austin, Texas.
, P. K	O. & M	Pana, Ill.
Donald A	D., G. N. & M	*Pontiac, Mich.
son, T. V	C., M. & St. P	*Minneapolis, Minn.
ts, John	I., B. & W	Columbus, Ohio.
, John	F. & P. M	Port Huron, Mich.
n, M	C., N. O. & T. P	New Orleans, La.
son, W. D	C. & N. W	Carroll, Iowa.
, John M	Pa. & N. Y. C. & R'y Co	Towanda, Pa.
old, John C	A., T. & S F	*Mulvane, Kan.
son, M. W	C., B. & Q	*Burlington, Iowa.
ine, R	C. & W. M	*Holland, Mich.
, James	C. & E. I	Danville, Ill.
J. C	U. P	*Denver, Col.
Edw	B. & M	*Wymore, Neb.
r, F. E	St. L., K. & N. W	*Keokuk, Iowa.
, J. F	I. C	*Memphis, Tenn.
l, A	C., B. & Q	Rock Island, Ill.
J. W	N. N. & M. V	*Cecelia, Ky.
eld, James	Northern Pacific	*Livingston, Mont.
Stephen G	G. R. & I	*Kalamazoo, Mich.
n, Patrick	C. & N. W	*Boone, Iowa.
G. R	O. R. & N. Co	Portland, Oregon.
, M	C., N. O. & T. P	*Somerset, Ky.
ey, P	K. C., St. J. & C. B	Council Bluffs, Iowa.
, John F	R., W. & O	*Carthage, N. Y.
an, D	Iowa Central	Keithsburg, Ill.
Daniel, Jr	W. N. Y. & P	Olean, N. Y.
en, L. H	Lehigh Valley	*Buffalo, N. Y.
aker, J. P	C., M. & St. P	Sioux City, Iowa.
rd, C. F	B. & M	*Ashland, Neb.
e, W. W	S. F. & W	*Waycross, Ga.

Southgate, R	R. & D	Columbia,
Stockwell, C. H	C., M. & St. P	*Coon Ra
Stafford, M. A	Central Iowa	*Oskaloos
Stackhouse, R. J	Danbury & Norwalk	— —, Cor
Stimson, W. B	G. R. & I	*Grand Ra
Stewart, John	L. S. & M. S	Coldwater,
Starwalt, W. L	D., F. W. & C	Covington,
Stetler, J. H	A., T. & S. F	*Ellinwoo
†Stearns, W. H	C. & N. W	*Oak Park
†Sterling, J. M	Central Michigan	Grand Ra
Stafford, W. J	F. E. & M. V	Oakdale,
Sutherland, A. M	D., S. S. & A	*Marquett
Sullivan, J	Illinois Central	Dubuque,
Sullivan, Martin	Rocky R. Ice Co	*Bronco, C
Summerset, W. B	Carolinia Central	*Charlotte,
Sullivan, J. D	C. K. & N	Horton, K
Supplee, J	Pennsylvania	*Erie, Pa.
Swinney, S. L		Edwardsvi
Sweeney, D	C., R. I. & P	Belleville,
†Swart, E. F	Lehigh Valley	*Auburn,
Swan, R	B. & O	*Pittsburg,
†Taubken, J	C., H. & D	Lima, O.
Teller, Charles B	A., T. & S. F	*Pueblo, C
Thomas, J. L	Int. & Great Northern	*San Anto
Thurston, J. C	C., St. P., M. & O	*Black Ri

Watts, T. J	D. & I. R	Two Harbors, Minn.
Wallace, W. J	E. S	*Eureka Springs, Ark.
Watt, J. B	N. P	Brainard, Neb.
Walsh, William	Canadian Pacific	Three Rivers, Quebec.
Walters, Robert	M. & N. W	Portage La Prairie, Manitoba, Can.
Walker, I. O	T., St. L. & K. C	*Charleston, Ill.
Wallace, J. H	Southern Pacific	*San Francisco, Cal.
Welsh, Thomas W	O. & M	Mitchell, Ind.
Weight, Geo	A., T. & S. F	Topeka, Kas.
Weaver, J. H	Georgia Pacific	
Weed, S. E	B. C	*Buffalo, N. Y.
Wilson, D. C	W., St. L. & P	*Pueblo, Col.
Willis, R. A	C., St. P., M. & O	*Omaha, Neb.
Wilderson, L	W. & L. E	*Orrville, Ohio.
Worley, Geo	Hot Springs	Texarkana, Ark.
Worthley, A. H	K. C., St. J. & C. B	*St. Joseph, Mo.
Woodard, J. M	A., T. & S. F	*Pueblo, Col.
Wright, John W	C. & N. W	*Baraboo.
Wright, David	S. S. M. & A	*Minneapolis, Minn.
Wyman, W. P	Northern Pacific	*Ft. Custer, Mont.
Wynne, Jas	D., L. & W., (Buf. Div.)	*Elmira, N. Y.
Wyatt, F	O. & M	*Aurora, Ind.
Wynn, John,	St. L. Br. Co. & U. D. T.	*Union Depot, St. Louis.

LIST OF MEMBERS ADMITTED SEPTEMBER 9th, 1890.

hern, T	So. Pacific, (Sac. Div.)	*Blue Canon, Cal.
dams, P. J	B. & O., (Pitts. Div.)	*Washington, Pa.
nthony, R. J	Mexican National	*Mexico City, Mexico.
Burk, James	M., St. P. & Ste. S. M	*Gladstone, Mich.
Beatty, Daniel P	C. & E. I., (T., H. & St. L. Div.)	*Danville, Ill.
urke, M	C., C., C. & St. L., (Peoria Div.)	*Urbana, Ill.
urke, C	L., R. & Ft. S	*Little Rock, Ark.
ailey, David	Richmond & Danville	*Culpepper, Va.
urkhalter, Myron H.	So. Pacific, (Shasta Div.)	*Hornbrook, Cal.
urke, John	C., M. & St. P	*Chillicothe, Mo.
ryan, J. O	C. & N. W	*Missouri Valley, Iowa.
rown, Nicholas	D. B. C. & A	*Black River, Mich.
Brew, M. Js	L. S. & M. S. (Chi. Div.)	*Englewood, Ill.
Bowen, F. S	G. R. & I	*Kalamazoo, Mich.
Conner, W. H	Wabash (Eastern Div.)	*Columbia City, Ind.
lark, C. M	Mo. Pacific	*Weeping Water, Neb.
Clark, John W	C., W. & I. and C. Belt	*Dearborn Sta., Englewood, Ill.
Comeford, Michael J.	Kings Co. Elc. (Fulton St. Div.)	*Brooklyn, N. Y.

Hawkins, E. P	Mobile & Ohio	*Crawfor
Hedeen, A. W	A., T. & S. F	*Chanut
†King, W. L	D., Ft. W. & C	*Dayton
Kiley, David	C., C., C. & St. L	*Indiana
King, P. F	M., K. & F	*Empori
Littlefield, S	R., W. & O	*Oswego
†Maloney, P	Norfork & Western	*Chillicc
Madden, Pat	C., M. & St. P	*Aberde
†McClaren, W. J	T., C. & C	*Bowlin
McGuire, D. R	Missouri Pacific	*Council
McMahan, John	D. & R. G	*Leadvil
Neuman, C. H	C. & D and C. & S	*Florenc
†Nettleton, Geo. A	Pontiac, Oxford & North,	*Pontiac
Nelson, Knute	C., M. & St. P	*Milban
Perkins, Edward C	Mexican National	*Mexico
Palmer, James E	Peoria & Pekin Union	*Peoria,
†Prentice, J. A	L. S. & M. S	*Toledo,
Sattley, Robert C	C. & N. W	*Wheatc
†Shannessy, E. J	G., R. & I	*Grand
Sweeny, John	D. & R. G	*Leadvil
Toft, Andrew J	Southern Pacific	*Trucke

A letter from Charles Melville to the
Association of America was read by the Sec
lows:

G., H. & S. A. R
Office of R
GLIDDEN, TEXAS,

place for our next meeting, which is, gentlemen, San Antonio, Texas; and hope that as we have always met East, West and North, that my nomination will be favorably received. Again wishing you all a good-time, I am Yours truly,

CHARLES MELVILLE,
Roadmaster G., H. & S. A.

The President—The next thing in order is the approval of the report of the proceedings of the meeting at Denver, last year, as published. Gentlemen what will you do with the report?

J. W. Craig—I move that the following corrections be made of the report of the Denver meeting, of Sept. 10th, 11th and 12th, 1889:

To the President and Members Roadmasters' Association of America, in convention assembled at Detroit, Mich., Sept. 9th, 1890:

I beg leave to submit the following report to amend the proceedings, as now printed, of the meeting of the Roadmasters' Association of America, held at Denver, Colorado, September 10th, 11th and 12th, 1889:

First—To strike, on pages 35 and 82, the discussion of Messrs. Shea and Cornell, for the reason that these gentlemen were not present at the Denver meeting, and therefore could not participate in the discussions.

Second—"Standard Track Joints."—That the report of the Committee, and the print on page 92, be stricken, for the reason that it does not belong in the printed proceedings. That the resolution of J. W. Craig, on page 98, and the amendment of W. H. Courtney, on page 100, together with the print and majority report of the Committee on page 26, as printed in the proceedings of the Washington meeting, be substituted for the report of the Committee, as now printed in the proceedings of the Denver meeting.

Third—That the address of Mr. Preston on pages 107, 108, 109 and 110, be stricken, and referred to a Committee, Mr. Preston as Chairman, to carry out the motion offered by J. W. Craig, on page 111, which motion was "seconded and carried unanimously." Also, see report of Committee on this subject on page 116.

Fourth—That on page 117 the vote on suspending the rules be changed to read twenty-three "Yeas," to fifty-five "Nays," for the reason as now printed the affirmative is made the negative. J. W. CRAIG.

Motion carried.

On motion it was agreed that any member, after examining the minutes of the preceedings of the last meeting, may submit such corrections in writing to the convention as he may desire for its action, at any time during the session of this convention.

J. W. Craig—I desire further, Mr. President, to take up the matter of the proceedings of the Denver meeting, to ascertain if possible what action, if any, was taken on the report of the Committee on Standard Frogs, and refer to the minutes of the proceedings of that meeting from page 87 to 89, and page 113 and 114. Now I desire to know what action was taken on the report of that Committee.

The President Mr. Craig was President of the Denver meeting, and he ought to know what disposition was made of that report. This matter came up at the Washington meeting.

J. W. Craig—I beg to differ with the chair. My office expired by limitation. When he assumed the chair the report was in the hands of the President and Secretary. I was a private in the rear ranks at that time. The report in the first place was not presented at Denver, and there was nothing done in regard to that report at the Denver meeting, and how what appears got into the proceedings I don't know.

James Sloan -I think probably the reporter has it yet.

J. W. Craig I cannot say as to that. I do not know. We must dispose of the matter, because we can not afford to be left on the record as ignoring a communication from the President of the Superintendents' Association. We have not done anything very serious by delaying it ; still we must dispose of it.

J. M. Meade Will the Secretary read the names of that Committee?

The Secretary read the names of the Committee as follows:

P. Nolan, Chairman; D. H. Lovell, O. F. Jordan, R. Caffrey.

The President—I will state for the benefit of Mr. Meade that only one member of that Committee is present, and that is Mr. O. F. Jordan.

J. M. Meade—I would like to have Mr. Jordan make a statement to the convention as to what was done with that report.

Mr. Jordan—What meeting do you refer to?

The President—The Denver meeting. What disposition was made of the report of the Committee on Standard Frogs?

Mr. Jordan—I do not know as I know exactly what was done with it.

D. Elliott—Mr. President, if I understand the matter right, the Committee made a report in regard to the letter of the Association of Superintendents. And that report was to a certain extent adopted at our Denver meeting; but there has been no acknowledgement of the communication by the Secretary of our Association. I would therefore move that the present officials of this Association acknowledge the same to the Superintendents' Association, stating what action was taken at the Denver meeting on their letter to us, and also explaining how the failure to acknowledge the receipt of their communication heretofore occurred, and that the matter shall receive attention at the earliest practicable time.

Carried unanimously.

The President—Does this dispose of all the matter at the Denver meeting?

J. W. Craig—It is all I have to say about it.

Thereupon the report of the proceedings of the Denver meeting was approved, subject to such amendments as the convention may make upon motion or request of individual members.

The President—The next thing in order is the reading of the names of the new applicants for membership.

Thereupon the Secretary read the names of applicants. All of whom were, on motion, received as members of the Association.

The President—The next thing in order is correspondence. There being none, the chair will state that the Executive Committee met in Pittsburgh, Pa., on May 26th, 1890, and chose the following subjects for discussion, and appointed committees for each as follows:

TRACK JOINTS.

R. Black, R. M. Manhattan E. R. R. (Chairman)............. ....
..............................No. 71 Broadway, New York, N. Y.
John Doyle, D., L. & N....................................Detroit, Mich.
B. Murtaugh, Central R. R. of New Jersey............Jersey City, N. J.
W. H. Stearns, C. & N. W. R. R........................Oak Park, Ill.
C. E. Marvin, C. R. R. & B. Co............ ....Savannah, Ga.

NUT LOCKS, TRACK BOLTS AND SPIKES.

George W. Bishop, R. M. Fitchburg R. R. (Chairman)....Athol, Mass.
D. Kindelan, C. M. & St. P. R. R........................Mitchell, Dak.
M. Philbim, C., R. I. & P. R. R...............................Joliet, Ill.
J. M. Meade, A., T. & S. F. R. R........................Topeka, Kan.
H. W. Reed, S. F. & W. R. R.........................Waycross, Ga.

BEST METHODS FOR PRESERVING CROSS-TIES.

C. H. Cornell, C., M. & St. P. R. (Chairman)............Dubuque, Iowa.
B. M. Burroughs, S. C. & P. R. R.....................Tallahassee, Fla.
George Wright, A., T. & S. F. R. R.....................Topeka, Kan.
J. R. Patch, Conn. River R. R.......................Springfield, Mass.
John Supplee, P. R. R...Erie, Pa.

BEST METHOD OF INSTRUCTING SECTION LABORERS, ETC.

R. Caffrey, Lehigh Valley R. R. (Chairman)..........White Haven, Pa.
O. F. Jordan, M. C. R. R.........................St. Thomas, Ontario.
Pat. Nolan, N. O. & T. R. R.......................Birmingham, Ala.
William Riley, C. & A. R. R.......................Bloomington, Ill.
J. W. Craig, C. & S. R. R.........................Charleston, S. C.

TO PROCURE PLANS AND CUTS FOR INTER-LOCKING DEVICES.

John Wynn, St. L. Bridge Co., (Chairman) Union Depot...St. Louis, Mo.
R. Black, R. M. Manhattan E. R. R., 71 Broadway... .New York, N. Y.
George W. Offutt, Long Island R. R............Long Island City, N. Y.

The President—The order of business now will be the reports of the various committees. The first in order is the report of Committee of Track Joints. Is the Committee ready to report?

R. Black, Chairman—Our report is not quite ready, and we would ask further time. Granted.

The President—The next thing in order is the report of e Committee on Nut Locks, Track Bolts and Spikes. Is e Committee ready to report?

Geo. W. Bishop, Chairman—The Committee would like rther time.

Mr. Craig—How much further time do you want?

Mr. Bishop—We will do the best we can to have our re- rt ready to submit between three and four o'clock this ternoon.

On motion of Mr. Doyle, the Committee was granted the rther time asked.

The President—The next thing in order is the report of e Committee on The Best Methods for Preserving Cross- es.

The Chairman of this Committee not being present, the port was passed.

The President—The next thing in order will be the report the Committee on the Best Method of Instructing Sec- n Laborers, etc.

The Committee asked for further time, and on motion of r. Doyle it was granted until 3 p. m.

The President—The next thing in order will be the report the Committee appointed to procure Plans and Cuts for ter-locking Devices now in use.

John Wynn, Chairman—Mr. President, I have been some- at disappointed in getting my blue prints of specifica- ns. Probably I may get them later. But I think Mr. ack, who is also on the Committee, is present, and I under- nd is prepared to go ahead and dispose of some things.

R. Black—Mr. President, I have blue prints of the differ- t machines in my room, and I will this afternoon see Mr. ynn and turn them over to him with a full report of the ne. I would like to further state, in relation to the Com- ttee on New Joints, the reason we were not ready this rning with a full report, was that there were some new nts that had not yet arrived, and we were desirous of giv- g each and every new joint due consideration, and concluded to wait until this afternoon before acting on them. I will further state if the Committee on Joints will meet me in my room at 2 p. m., at the Hotel Wayne, we will finish up the business in short order.

The President—Can the gentleman state at about what time the Committee will be ready to report?

Mr. Black—It will be four o'clock before we will be ready to make the report, provided the Committee will be ready to meet me at 2 p, m.

H. W. Reed offered the following resolution:

Resolved, That a Committee of five be appointed by the President to consider a revision of the Constitution and By-Laws of this Association, and to report at this convention.

In speaking to the resolution, Mr. Reed said: Mr. President, my object in offering this resolution is that it has been suggested that it would be advisable to have permanent committees appointed on various subjects which may be considered by our Association. If we propose to keep in the line of progress we must make our inquiries more exhaustive and our investigations more thorough. There are also other points which have been suggested by different members in conversation with me, which could very profitably be considered by this Committee. I therefore offer this resolution.

The resolution was seconded.

The Secretary—Mr. President, I believe that matter came up last year, and comes up this year as unfinished business.

Mr. Reed—Then I would move a suspension of the rules for the purpose of introducing this resolution. Seconded.

A rising vote was taken, and resulted in 19 votes for and 21 against.

The motion to suspend the rules was therefore lost.

On motion, the Secretary was directed to have printed, for circulation among the members, a sufficient number of copies showing the various committees and the subjects assigned for discussion.

On motion of Mr. Doyle, the convention took a recess until 2 p. m.

Afternoon Session.

The President called the convention to order at 2 p. m.

The Secretary—Mr. President and Gentlemen, before pro-
eding with the regular order of business, I wish to call the
tention of the members to the fact that on page 87 of the
port of the proceedings at Denver will be found the re-
rt of the Committee on Standard Frogs, which was re-
ested to be reported upon at that meeting, but which
port appears out of place in the record. The report is full
d complete in itself, and is signed by P. Nolan, Chairman;
. Caffrey, T. Hickey, O. F. Jordan, J. H. Preston, A. B.
dams, C. H. Cornell.

This was acted upon at the meeting. The report was ac-
pted and the matter dropped.

The President - We have some other unfinished business.
committee was appointed on the address delivered by J.
. Preston on "Organization of Societies." This Commit-
e is composed of the following named gentlemen, viz.:
hn Sloan, O. F. Jordan, C. E. Jones and John P. Ramsey.
this Committee ready to report?

There being no response to the inquiry of the President,
e subject was passed.

The resolution of Mr. Reed to appoint a committee on
vision of the Constitution and By-Laws was called up and
animously adopted.

The Chair announced that he would name the committee
xt morning.

The President—We have a letter here in regard to the matter of going to Niagara Falls, which the Secretary will read for the benefit of the Association.

The Secretary read the letter referred to, as follows:

SUSPENSION BRIDGE, 4:05 p. m., Sept. 7, 1890.

O. F. Jordan:

I have obtained special rate of three dollars per day at International or Cataract Houses. Mr. Gluck, of International House, says he will give your party four dollar a day accommodations, and I think you will be best served at that house. The Suspension Bridge and the Cantilever Bridge, at Suspension Bridge, will be at your service. Am offered a return rate over the bridge at Niagara Falls of fifteen cents. I get special rates on carriages, and free entrance to many places of interest. Advise what arrangements to make. I am at your service until after you leave here on September 13th. F. D. SWAN.

The President—We will now have the report of the Committee on Nut Locks, Track Bolts and Spikes.

The report of the Committee on Nut Locks, Track Bolts and Spikes being called for, George W. Bishop, Chairman, submitted the following report, which was read by H. W. Reed, as follows:

To the President and Members Roadmasters' Association of America:

GENTLEMEN—Your Committee appointed to consider and report on the subject of nut locks, track bolts and spikes respectfully report, recommending that railroad officials should exact, and manufacturers should give, greater attention to the production of track fastenings, superior both in material and workmanship. The great tendency is to cheapen the product at the expense of its quality, and this your Committee deem it wise to protest against. With reference to nut locks, there are two general classes—positive and elastic. Your Committee does not consider it proper to suggest any particular manufacture or design, but recommend the following general specifications:

For general main line use, an elastic steel nut lock washer, made with high temper and with sufficient resistance to require a pressure of at least 3,000 pounds to compress it; the total possible compression not to exceed $\frac{3}{8}$ of an inch. For frogs and crossings, an elastic washer with a resistance of 6,000 pounds, or a positive nut lock may be used. The elastic washer should present a total bearing surface—upon each nut and the plate—of at least $\frac{3}{4}$ of a square inch; and it would be better i that surface could be increased to at least 1 square inch.

A washer of this character should be used with every bolt, and shou

compressed by the nut, not to exceed 80 per cent. of its possible com-
ssion.

Vith reference to track bolts we would recommend the following
meters: For rail from 50 to 60 pounds per yard, ¾-inch; from 60 to
ounds, ⅞-inch; above 80 pounds, 1-inch, and 1-inch bolts should be
d with all frogs. The material of all bolts and nuts should be steel.
length bolts should not extend "more than ¼" from nut when the
er has been screwed up properly. Threads should be of standard
tern, and both nuts and bolts should be threaded so as to produce, as
rly as possible, a uniform and close contact between the planes of the
eads. Heads of bolts should be round, with an oblong shoulder next
ead to prevent turning. The nut should be of the hexagonal pat-
, the thickness of nut, and the width of each hexagonal face, should
the same as diameter of bolt.

Vith reference to spikes we would recommend steel as the best ma-
al. Pattern the same as now in general use, and size 5½ inches long
ler the head by 9-16-inch diamater. The points should be neatly
shed--of such a shape as to admit of driving without turning from the
, and to avoid seriously injuring the fibre of the wood.

Ve recommend steel spikes because we believe that such material,
perly tempered, will wear far better than iron at that part which
es in contact with the rail, and, also, because we believe a steel spike
nger than an iron one of same dimensions.

G. W. BISHOP,
M. PHILBIM,
J. M. MEADE,
H. W. REED,
J. KINDELAN.

n motion of J. W. Craig, the report was accepted for the
pose of placing it before the convention for discussion.

he Secretary– In order to start matters, Mr. President,
nderstand from the report that the intention of the Com-
ttee is to have the nut lock not to be compressed to the
l limit, but rather eighty per cent., as the report men-
ns. I have always seen it practiced, and my own men
actice tightening up (take the Verona nut lock for ex-
nple) to the full extent of its elastic limit. Not to its
astic limit, either; that is wrong; but until the spiral is
osed. Now, I would understand from the report, that this
not intended, but rather that the nut lock should be of
h strength as not to require being tightened up com-
tely, Further along in the report it is recommended

that a hexagonal nut be used in preference to a square or any other shape. Now, you have all seen and know of the square nut, the corners of which coming in contact with the angle bars were cut off so as to have the same advantage of the hexagonal nut, but at the same time giving greater surface for the track wrench. You all know that after your bolts have been tightened once or twice, the corners become worn off; and that being the case, it is very difficult to tighten or loosen them. Now, I am of the opinion that the hexagonal nut does not offer surface enough for the track wrench, and that it should be a square nut with such cutting away of the corners as will permit free movement on the angle bar. I have been under the impression that the hexagonal nut was made with the intention or with the purpose of overcoming the trouble that was experienced in turning the square nut when used in connection with the angle bar. This can still be overcome by cutting away the corners that come in contact with the angle, and have the advantages of the square and the hexagonal nut combined. I, for myself, am in favor of a nut of such construction.

J. Kindelan—Mr. President, our Committee has recommended the tightening of the nuts only eighty per cent. for the reason that the intention of the spring nut lock is to admit of expansion and contraction; and when fully tightened up expansion and contraction can not take place. If room is not left for expansion between the splices, the track will be forced out of line. That is one reason why we should use the spring nut lock in preference to the positive nut lock. And I think the reasons which led to the adoption of the hexagonal nut should be sufficient to retain it in service. I do not think the wear on the wrench should count for anything at all against those reasons in favor of the hexagonal nut. It would be much more difficult, I think, to prepare a square nut, if it had to be prepared for use with an angle bar, than to use the hexagonal nut.

W. H. Stearns—Mr. President, that Committee in recommending a nut lock, prescribed one to resist a pressure of 3,000 pounds even. Now, with angle bars of four bolts you will get a pressure of 6,000 pounds. It wasn't so stated, but I presume they meant the minimum—two bolts at the end of each rail. We will say 6,000 pounds. Now, we know 6,000 pounds is not going to prevent the rail from expanding in a hot day, or from contracting in a cold day; and if that is the only reason why the gentleman advocates the elastic nut lock, I think we have other very good reasons we can name, and thereby add to the report of the Committee. The worst fault I know of with bolts, is their liability to become loose; and a pressure of considerably more than 3,000 pounds is necessary to be applied to them to keep them tight for any considerable length of time. And a very important office of the elastic nut lock is to quiet the noise you would get if there was no elasticity, and if you had to take it up. I give that as a better reason for its use. Now, they say they are not going to compress this elastic nut-lock to its full bearing; they are not going to bring it down to the angle bar, but are going to allow it to stay open. You propose to reduce it to eight-tenths of 3,000 pounds, or 2,400 pounds pressure on that bolt, which, gentlemen, I consider is insufficient to keep the splices up any length of time; not a sufficient length of time to enable us to get over our sections and do up the work and get around again to the tightening of bolts.

Mr. Kindelan—Mr. President, as I understand 3,000 pounds is the minimum. It should appear so in the report. They would not accept a nut lock, the minimum pressure of which was less than 3,000 pounds. They can make them capable of eight or ten thousand pounds pressure if they wish.

Mr. Bishop—I think Mr. Stearns attempted to convey the idea to this convention that there would be but 3,000 pounds pressure on a joint. There being four bolts to a joint, there would be four times that pressure when you consider the question of contraction and expansion.

Mr. Stearns—In considering the resistance that must be overcome from expansion and contraction, we should only consider the end of one rail, which would have two bolts. If one rail should expand, you can fill up the space, and the next rail will drive it back if that one don't come of itself.

Mr. M. Shea, being called upon by the Chair said: I don't know that I can throw any light on the subject of expansion and contraction. It is something I never could understand or fathom. I know iron will expand and contract, and you cannot prevent it. The spring nut lock is a good thing. So far as tightening it up 80 per cent. of its capacity is concerned, I don't know, but I think I would like to tighten it up as tight as I could. I don't know as I can throw any more light on the subject.

The President—I do not think the object of the discussion of the nut lock is to ascertain how to prevent expansion and contraction of iron, but rather to prevent the rattling from looseness at the joints.

C. E. Jones—The report of the Committee, as read, was not heard by a number who have come in since it was read, and for the benefit of those members I would suggest that the Secretary again read the report.

It was so ordered by the President, and the Secretary read the report of the Committee.

The President—If there are no further remarks to be made on the subject, the report is ready for the action of the Convention.

Mr. J. W. Craig—I move the adoption of the report.

The motion prevailed, and the report was unanimously adopted by the Convention.

The President—The next thing in order is the report of the Committee on Track Joints. Is the Committee ready to report?

R. Black, Chairman of the Committee on Track Joints answered that the Committee was ready to report, and thereupon presented the following report, together with samples:

REPORT OF COMMITTEE ON TRACK JOINTS.

the President and Members Roadmasters' Association of America;

ENTLEMEN—In approaching the matter of new joints, your Comtee were struck with the fact that while improvements in other nches of the railway service have always met with a prompt and dy trial, yet no concentrated effort has been made to try devices for improvement of rail joints; and in their investigations they have met so many new, bright, and apparently practical ideas in the joining rails, that they feel it is only a question of a very short time and l when an appliance will be secured which will be as far ahead of fish and angle bars, as they were ahead of the original rail chair.

s your Committee progressed, the magnitude of their work became arent, but they were not dismayed; on the contrary, they were deted to find many inventive minds at work on the subject of rail joints.

hat a rail joint is the most vital article pertaining to a railroad, has n long acknowledged and recognized by all engaged in the business; it was a revelation to your Committee to find keen intellects in all walks of life grappling with the problem of a betterment in this nch of railroad maintenance.

n beginning its investigations your Committee caused a notice of its pose and aims to be published in several of the railroad journals, and forwarded a copy of the following letter to all owners and inventors oints of whom they had any knowledge:

[illegible]

[illegible]

DEAR SIR—As Chairman of the Committee of the Roadmasters' ociation of America on New Joints, I take the liberty of calling your ce to the purposes of this Committee, and to request you to submit a ple of your joint under the following conditions:

he Committee are to ask manufacturers and inventors to submit a ple of their joints, with a test sheet signed by a civil or mechanical neer, showing the bearing and recovering strains of the same. The mittee are to select from the joints presented a number of those prenng the best features, and recommend them to the convention next ember for trial. The joints so selected will be taken in charge by ssociation, and have an official trial on roads they will select. The t of the trials will be reported to the succeeding convention.

Vill you please inform me if you desire to enter the above, and how joints you will be willing to furnish the Association for trial?

"Yours respectfully,
(Signed) ROBERT BLACK,
Chairman Committee on New Joints."

this letter your Committee had a vast number of responses from er the continent, and every courtesy and opportunity has been exed them in their investigations. They have carefully and thoroughly examined many joints, and take pleasure in reporting to you that there were but few of the joints which did not contain valuable features; yet, guided by the essential question of practical use, they have selected as worthy of consideration and trial by the Association the following joints:

Webber Rail Joint,
Col. Long's Truss Joint,
McConway & Torley's Reinforcement for Present Angle Bars,
Fisher Joint, "New Improved,"
Cloud Joint.

In making the investigation of these new joints, your Committee has been at work for the past three months, and has given full consideration to the strain sheets of each joint. They have provided for both a a supported and suspended joint, as well as selecting devices for use in connection with the present angle bars.

Your Committee has the assurance of the owners that the Association will be furnished, free of charge, with as many joints as will be required for the test; and, if the Committee may be allowed, they would suggest that the Executive Committee take charge of the tests and trials for the next convention.

ROBERT BLACK, Chairman,
JOHN DOYLE,
B. MURTAUGH,
W. H. STEARNS.

The President—You have heard the report of the Committee on Track Joints, as read by its chairman, Mr. Black. What disposition do you wish made of it?

J. W. Craig—As I understand, Mr. President, the report of the committee recommends nothing. It is just a statement of what they have done up to this time. I therefore move that the report be received as information, and also that the joints which the chairman of the committee now has, form a part of the report of the committee.

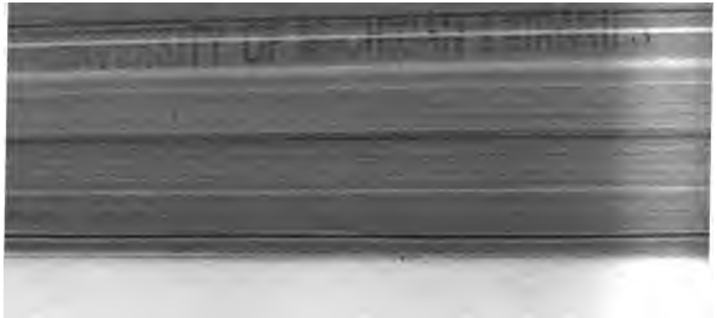
Seconded.

The President—The subject is now open for discussion.

Mr. Black—The joints are in the room ready for inspection at any time by any member who may wish to inspect them.

Mr. Kindelan—Is there to be another committee appointed to make the test?

The President—According to the reading of the report, it was to be turned over to the Executive Committee.



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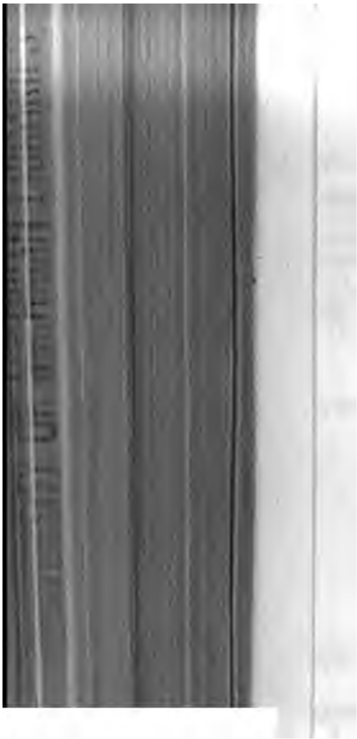

Mr. Kindelan--I didn't so understand it.

Mr. Doyle--As I understand it, it is before the Association for it to say whether it shall be referred to the Executive Committee or not.

Mr. Craig—The report, as I understand it, provides that the joints be turned over to the Executive Committee, to be by them assigned to different roads to test them, and to report the result to the next convention.

The President—That is my understanding of it.

Mr. Craig—The prints that the chairman of the committee has do not admit of any discussion, because the committee was appointed to select those joints, and have done so; and my motion that the report be received and the prints turned over to the convention, will give all the information as to what they are, so when the report is made at the next meeting as to the result of the tests, it will then be ready for disposition by the convention.

The Chairman -It has been moved and seconded that the report be turned over to the Executive Committee, and the blue prints connected with it, and samples, and that they refer it to the different roads for tests. All in favor of that disposition of the report, will signify the same by saying "aye," and the contrary "no."

Carried unanimously.

The report of the Committee on The Best Method of Preserving Cross-Ties was called for, and no one responded. The Secretary, in answer to a question by Mr. Craig, stated that the committee appointed to report on that subject, had never notified him of its acceptance of the appointment. Thereupon Mr. Craig moved that the Chair appoint a committee on The Best Method of Preserving Cross-Ties, to report to this convention.

Carried.

The President- The next in order is the report of the Committee on The Best Method of Instructing Section Laborers, etc.

The chairman, Mr. O. F. Jordan, submitted the following report, viz:

To the President and Members Roadmasters' Association of America:

GENTLEMEN:– Your Committee appointed to report on the best method of instructing section laborers with a view to promotion to foremen, begs leave to present the following report:

In view of the extremely low wages paid to trackmen generally, in comparison with that of men in all the other departments of railroad service, while the qualifications of a good trackman are those of a first-class mechanic, it is desirable to overcome, if possible, this discouraging influence in some manner, so as to secure more proficient foremen.

Apprentice gangs have proved successful on some railroads in the Southern States as a means of encouraging a better element of labor to become trackmen. This want is not felt on the railroads in the Northern States, but they require to as great an extent some system of encouragement, so that the young men will continue in the track service, and thus create more efficient track laborers and foremen.

It is self-evident that this encouragement must be bestowed locally so that its influence may be felt in every gang on the road; whereas, it is apparent that an apprentice gang centralizes this encouraging influence, and would be detrimental to the majority of railroads.

We believe that to meet both cases the following system will be found quite available:

First—That there should be an assistant foreman on each section and floating gang, and, if at all possible, selected from young men who are laborers on the sections, floating gangs and repair or construction trains.

Second—That the assistant foreman shall be appointed by the Roadmaster on recommendation of the foreman, endorsed by the Supervisor, and selected with as great care as if he was appointed to a foremanship.

Third—The assistant foreman shall work with the laborers except when the foreman finds it necessary to leave the gang, then the assistant foreman shall have charge during the absence of the foreman.

Fourth—Should the assistant foreman be found at any time incompetent or unfit, he shall be reduced to a laborer, and another assistant foreman appointed in his stead.

Fifth—The assistant foreman shall be paid at an increased rate of pay beyond that paid for laborers, according to his qualifications.

Sixth—When a vacancy occurs in the foremanship, from whatever cause, the assistant foreman shall fill the position until a foreman is duly appointed, a preference being given to the assistant foreman.

R. CAFFREY, Chairman,
J. W. CRAIG,
O. F. JORDAN,
WILLIAM RILEY.

J. W. Craig—Mr. President, I move the adoption of the report.

James Sloan—I second the motion.

H. W. Reed—Mr. President, I can hardly agree with the report of the Committee. I have had nearly ten years experience with the apprentice gang system. The report of the Committee, as I understand it, applies to the entire country. It makes no exception. The recommendations apply to the South as well as to the North. I agree with the gentlemen that the conditions should be the same in the South as in the North. I have had, as I said, nearly ten years experience with the apprentice gang system on a Southern railroad of considerable length; and every year has convinced me more thoroughly that that is the proper method of instructing section foremen. My reasons are various; some of them I will endeavor to state. In the first place railroad companies are seeking uniformity. If the instruction necessary for making first-class foremen of young nexperienced men is carried out with uniformity among the young men employed for that purpose on railroads, the result then will bring about that uniformity which is desired.

In my case, I have an apprentice gang foreman. He is a man above the ordinary ability and intelligence. He is thoroughly conversant with all departments of repair work. In his hands and under his control are placed these young men; they are given special instructions in all the various branches of their work. That instruction applies to all, as well as to one; it is uniform; it is the same. They go out with the same ideas. They are able to carry out the ideas of the Roadmaster and management better than if placed nder the charge of a number of irresponsible foremen.

The system formerly in use on the road with which I am nnected, was for young men to be selected exactly as Mr. rdan has stated in the report. We had difficulty in secur- good men under that system. We found one cause of that difficulty was the jealousy of the foremen. They uld not give these young men the opportunity that was necessary to make them thoroughly competent foremen. One of the young men gave me his experience. He said, whenever the foreman went to raise the track—and I will state that the foreman in charge of the gang was a man trusted by the management—that foreman would send him off to do some other work, and would raise the track himself; and that young man never did learn how to raise track until he took personal charge of a gang and learned it from one of the hands. It is not so under the apprentice gang system. They are required to learn every branch of the work which they may be expected to superintend afterwards.

Now with reference to another point. Under that system which I call our old system, a foreman is placed perhaps on one part of the road where the conditions are entirely different from what they are on another part of the road. If these young men are scattered over different parts of the road, some of them will learn one thing, perhaps proficiently, but may never learn other things of equal importance. But if they are placed in one gang, and are located at a point where there are the largest number of conditions possible, the greater will be the benefit derived. For instance, the gang which I employ for that purpose has charge of a few miles of main line track. They have charge of a yard where they have to put in and maintain all kinds of frogs and switches—the Wharton switch, the split switch, switch crossings, and various kinds of spring and stiff frogs and crossings. They are required to build new tracks, and do a great variety of work. We also use them for going out to wrecks. We divide the gang in two parts, and in case of a wreck, or accident, or wash-out, one part of the gang is sent out, and a chance is given them to see how such work is done.

We find the results have been quite valuable. Our foremen have increased in efficiency since that system was organized. I speak therefore from experience, and as a member of the Association having this experience, I can not endorse the report made by the Committee.

A voice—How large is your gang?

Mr. Reed—The gang is composed of thirty men. These men are also given instructions in making reports. We all recognize the fact that reports are a very important part of railroad work. Records we must have in order to know how to economize in railroad work. Reports are kept by that gang, and every man who goes out has the necessary experience, in keeping records and making reports accurately. We have him under our eye, and know exactly his qualifications. I do not have to depend on discharged or disaffected men from other roads for foremen. We could not be with these men if they were scattered all over the road; we could not talk with them and learn their qualifications, and thus we would be unable to discard or avoid getting into our ranks unsuccessful foremen, whose incompetency is not discovered until we have lost money by them. We sift out the chaff and preserve the wheat. I say therefore, our system of instruction has proven in practice beneficial, and if that is so, I can not think it wise to adopt the report of the committee as presented to this Association.

The Secretary—I would like to ask the gentleman how many sections he has on his road? He has just stated that he has thirty men in his apprentice gang.

Mr. Reed—We have eighty-eight regular sections.

The Secretary—What prices do you pay your apprentice gang? I am asking this for information.

Mr. Reed—We pay our foremen two dollars and seventy-five cents per day. We pay our apprentices for the first period of their service, seventy-five cents a day; for the second period, one dollar per day; for the third period, one dollar and twenty-five cents per day, and for the fourth period, a dollar and a half per day. However, that is merely a local matter. That is what we can get men for. You may not be able to get men for that price, or you may get them for less.

The Secretary—I understand that. What inducement do you offer to your men to keep them on their sections during the period of waiting? With eighty-eight sections you can't have so many changes going on, especially if you have good section foremen.

Mr. Reed I will answer the gentleman by saying that we can't make the changes fast enough. They are not confined to our road alone; they go to other roads.

The Secretary—Then you lose the benefit of them.

Mr. Reed—At the same time we are in a position of greater independence. When any of our regular foremen are absent from sickness or other cause, or when they are discharged, or resign, we have satisfactory men whom we can put in their places. The result is a thorough efficiency in our service, and the value of the system is a demonstrated certainty.

The Secretary—I think you are right as to that, but my impression is you are doing more for other roads than you are doing for your own.

Mr. Reed—We are glad to do good to others, when, by so doing, we are subserving our own interests. Now in order to give time for this matter to be thoroughly considered by this convention, it occurs to me we should not act hastily—that this report should be laid over for another meeting. I would, therefore, offer a resolution that the report be laid on the table until the next meeting of the Association.

Seconded.

C. E. Jones—As we are getting near the end of the questions for discussion, perhaps it would be as well to discuss this matter here as thoroughly as we may deem it advisable.

Mr. Craig—I will have to call the gentleman to order.

The motion to lay the report on the table, on being put, was lost.

The President—The report of this Committee is still open for discussion.

James Sloan—I would like to ask Mr. Reed how many men he works in the winter—whether he works the full gang?

W. H. Stearns—I think Mr. Reed is probably correct as to the necessity of having foremen who can correctly make out reports. For if he has so many classes of men, with so many different salaries, it must be quite an important item to make out the reports at the end of the month, and to keep his men in the proper class. I am afraid we could not all be put to that trouble and expense of educating men for our own road, and also for other roads. We all have different ideas of the men we want to pick out for section foremen. It is an important feature to have men who will keep their reports in proper shape, so that we can tell, as a matter of record, what material has been received, used and consumed, and what our expenses at the end of the month have been. At the same time we want the track taken care of; and we want to get competent, energetic men to do it; and, if reasonable wages are paid for laborers, we have got the men to select from; and I believe that is the key note. Seventy-five cents and a dollar a day would not naturally bring a class of men that we want most on a section.

D. Kindelan---I think the method reported by the Committee may be useful in some sections, and the system described by Mr. Reed would be very useful in other sections. I think there is a supplementary method that could be adopted, and that is the education of foremen to use track literature. I think it of great assistance on a division. All the track literature in this country can be bought for a five dollar bill. I think this literature ought to be furnished for the perusal of the foremen and track men; it aids in the education for their work. Of course, as has been said by Mr Stearns, the wages paid is the key note. Large numbers of track men leave the road and go into other business because they can get reasonable wages for the work they are asked to do. Another thing: Where a Roadmaster has an experienced foreman doing difficult work of any kind, and who is not working under any of the systems mentioned, he should select from his inexperienced foremen and run them together occasionally, and allow them to participate in the work that the expert foreman is doing.

The Secretary—I am on rather a small road. It has only twenty-four sections, yet I think I would find some difficulty in maintaining an apprentice gang; and even if I were permitted to do so, I think I would find some difficulty in getting the class of laborers into it from which I would desire to select my section foremen.

With every section gang I have there are one or more men besides the foreman, who is really competent, with a little instruction, to take a section. And I state, as an inducement to my men, that I will not take on any outside men so long as I can get a man from among my employes who is competent to take charge of a section. And I am willing to go to a great deal of trouble to help them to overcome any deficiencies which may exist on their part. Now, suppose in the apprentice system, you have your gang located at one end of your 400 mile system—which is not a long one—and you have men scattered all along that road who are much better qualified than any of the men probably under tutelage, and who would willingly take any section; but who would not go, for the purpose of being placed under instructions, away from home so far for the rates which we pay. These men will take a section, but they will not leave home with the expectation that probably in a year or ten months they might get a section. So that really you may have some of the best men scattered along the division, while you have inferior men, to say the least, under instruction, and with whom you go to a great deal of trouble and probably expense to give them sufficient instructions to enable them to take a section. Whereas, in the other way, you will secure a very satisfactory foreman by a few weeks' practice in making out reports. True, I may possibly have a little more time to be with my men, than parties who have charge of four to eight hundred miles of road. I have 129 miles, and have no assistant. I have to look after the track, bridges, buildings and water supply; and that, with the in-truction of new foremen, requires a little time, as I have no loubt you will all admit. So that I think, whether on an ight hundred, four hundred, or one hundred mile system, he plan of having a right-hand man to act as foreman in ases of emergency, is a good one.

Mr. Meade—I would like to ask if there is a motion beore the house?

The President—There is.

Mr. Meade—I want to amend that report by moving to trike out that clause in reference to appointing apprentice oremen in each gang. I say let every man stand on the ame footing in a section gang, so as not to create any jealusy among the men.

Amendment seconded.

The President—Gentlemen, are you ready for the quesion on the amendment offered by Mr. Meade?

C. E. Jones—Mr. President, I have twenty-eight regular oremen, and at times I find it a very serious matter to now where I can put my hand on a reliable man to pronote to a section foreman. I find it hard to get young and ntelligent men to go into the track department with a prosect of being promoted to a section foreman. I have tried nany young men of average intelligence, and asked them o go to work for me with the prospect of giving them, ulimately, a section; and many of them would say to me, "I vould prefer braking to being a section foreman; there is nore money in it." I think this is a matter that should be horoughly considered, and if possible, we should discover ome remedy for the difficulty. I appreciate Roadmaster Reed's system, as missionary work. He says he helps ther roads. [Laughter.] I have one foreman who has een working for me for ten years, and I will put him gainst any man in the United States as a first-class tracknan; but I never have been able to get a man who has vorked under him, capable of taking care of a section. He an not, will not, or does not instruct a man who works for im so as to make him capable as a foreman. I have often studied the matter over to find out some solution as to why, being a first-class man himself, I never can get a good foreman out of his gang to take care of a section. I find the men who make the best section foremen are the men who have ambition to succeed and better their condition ; and as the average pay of the section laborer in our section of the country is a dollar and ten cents a day, if he can make himself capable of taking care of a section, and thereby earn forty-two dollars a month, he betters his condition that much.

G. W. Bishop—Mr. President, I wish to give the custom on the Fitchburg road where I am employed at this time, and say that the result has been very satisfactory. Our custom has been to have what we call a second hand in each gang, on each section, and in each floating gang. Now, about the foremen. When there is a vacancy on a section for a second hand, I look along the line and find, if possible, the best man to promote to that position, regardless of nationality. I want a man who can read and write, and who is intelligent ; and that man is promoted to a second hand with the understanding that when his turn comes, if he proves himself efficient, and is a good, reliable man, he will have a section. When we want a section foreman, I look over the list of second hands, and from them I select the one I consider the most competent, and the results are very satisfactory, indeed. All my foremen are capable of putting in frogs and switches and doing any track work without the presence of any Roadmaster or of any engineer. They can write good-looking letters, such as I am not ashamed to send to the office, and make correct reports. I should think it would be a good thing to hold out the inducement to young men who have education to enter the lines of track labor with the understanding that they will be promoted and get pay for their apprenticeship. I present this at this time in opposition to the amendment offered. I believe we should raise the standard of track work to the highest point, and we can only do that by getting men into line who have brains, good morals, and who are ambitious to get to the top. From our foremen Roadmasters are made. Our Roadmasters can do any part of the track work, from walking the track, up; and the section foremen know that if a vacancy of Roadmaster occurs, one will be appointed from among them. [Applause.] I have thirty-four gangs on my road, and if I wanted fifteen foremen to-day, I could make appointments from those gangs that I would feel proud of.

Mr. Meade—I would ask Mr. Bishop whether many vacancies occur to give him an opportunity to appoint?

Mr. Bishop—Occasionally a man will go wrong—will make some mistake—rendering it necessary to remove him, but the vacancies are very few, and when they do occur are from absolute necessity.

Mr. Adams, being called upon by the Chair, said: I have not much to say on the subject. Every man we have in the gang would make a good section foreman. Our section foremen hardly ever die, and therefore, to promote from the gang would make the foreman a pretty old man. If the opportunity was offered, every man we have in the gang would make a good foreman.

The question on the amendment offered by Mr. Meade, on being put, was carried by a rising vote of thirty for and sixteen against, and the clause in the report of the Committee relating to the appointment of apprentice or assistant foremen was stricken out.

Mr. Craig—Now, I call for the question on the adoption of the report as amended.

The Secretary—Mr. President, at the time of the reading of the report the second time, it was plain to be seen that upon the striking out of that portion in reference to the appointing of assistant foremen, the report was virtually destroyed. Now, in that condition we have it. Only a few preliminary remarks are left which led to the recommendation, so that I see nothing left for the Association to do but to recommit the report or appoint another Committee, On motion of Mr. Kindelan, the report was recommitted, the Committee to report on the afternoon of the next day.

The Chair announced the appointment of H. W. Reed, Chairman; George Bishop, J. W. Gregg, J. M. Meade and J. Kindelan as members of the Committee on the Best Method of Preserving Cross-Ties, said Committee to report at this meeting.

The Chair also appointed as Committee on Revision of of Constitution and By-Laws, J. W. Craig, Chairman; James Sloan, O. F. Jordan, C. E. Jones.

On motion, the Convention adjourned until next morning at 9 o'clock.

Morning Session.

DETROIT, Mich., Wednesday, Sept. 10, 1890.

The convention met at 9 a. m. President Sloan in the chair.

The Secretary called the roll, and all persons arriving since last roll call were invited to hand their names to the Secretary.

The Chair appointed a Committee on Resolutions, in reference to deceased members who have died since last meeting, and named the following gentlemen as members of that Committee: W. F. Ellis, Chairman; W. H. Stearns, J. A. Kerwin, John Tudhope, and J. M. Meade.

The President—Last evening, before adjournment, I appointed a Committee on Revision of the Constitution and By-Laws, and named Mr. Craig as Chairman. He being on another Committee, and having other business on hand, he says it is impossible for him to act on this Committee, and I will appoint in his place Mr. I. Burnett.

The sense of the house was taken as to whether the members would prefer going to Niagara Falls on Thursday, instead of Friday, as at first proposed; and it was agreed that Thursday would best suit the convenience of all concerned.

The President—The next thing in order is the report of the Committee appointed to Procure Plans and Cuts for Inter-locking Devices. Is that Committee ready to report?

The Chairman, Mr. John Wynn, announced the Committee was ready to report, and submitted and read to the Convention the following report, with blue prints:

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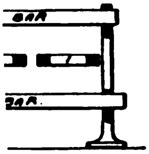
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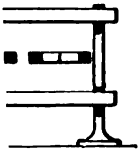

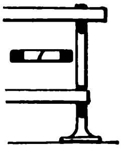

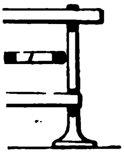

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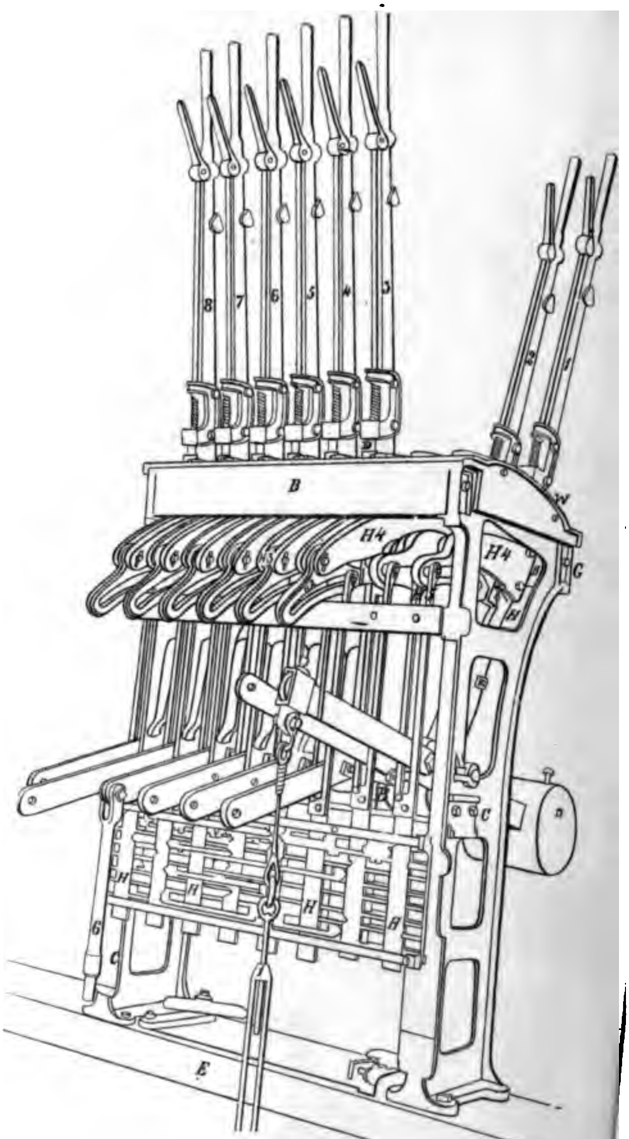


NG MACHINE.

by the beam e, and steadied, or braced, by being bolted to the floor-trimmer g.

The girders b' and b'' are made for spans of four and eight levers. Connection leading to switch is shown attached to one lever, No. 6, and connection leading to signal is shown attached to another lever, No. 1. The locking is in one vertical plane beneath the floor, and is easy of access, as are also all its parts, for oiling, cleaning and repairs. Its position protects it from dust, it is easy to alter in case of change of arrangement of switches and signals, and a complete new locking can, when desirable, be substituted for the old in a very short space of time, and at moderate cost, all the parts being interchangeable.

The vertical and radial movements of the latch d are communicated to the locking tappet h, by means of the connecting rod h' and rocker h'' centered at h''' to the brackets h'''', one of which is secured to each lever. The locking tappets h are connected to the reversing rocker h'' by a friction roller, which fits the radial slot in the rocker and is centered in the tappet jaw h'''''.

One lever, (say No. 1), is said to lock another lever, (say No. 4), when the moving of No. 1 from its normal position prevents the moving of No. 4 from its normal position. One lever, (say No, 2), is said to release another, (say No. 1), when No. 2 must be completely moved over from its normal position before No. 1 can be moved from its normal position. Generally, the following is understood, namely: That when 1 locks 4, 4 also locks 1; and when 2 releases 1, 1 back locks 2. Locking is said to be conditional, or special, when the position of one lever, (say No. 4), determines whether two other levers or more, (say Nos. 2 and 7), shall lock each other or one shall release the other.

In case a tappet is free, the intention of moving a main lever as expressed by grasping the handle and raising the latch, will raise the tappet and effect all the locking of other lever latches necessary to the safe movement of the lever in question. This movement also brings the rocker h'' into such position that the radial slot therein becomes radial to the center of the main lever, so that there is no movement of the tappet during the movement of said lever. When the lever is reversed, the dropping of the latch communicates a further upward movement of the tappet h, whereby the releasing is effected.

The action of one tappet is made to lock or release another tappet, by transverse connections, and dogs m, m', m'', *n and p*, carried in planed grooves of locking plate l, which also serves to guide and retain the tappets. Fig. 2 shows the locking and locking-plate more clearly than Fig. 1. The tappets are made of steel, as also are all the other parts of the locking, and are free to slide vertically in planed recesses of the locking-plate, and retained by wrought-iron strips. All the tappets are shown in their home or normal position, except No. 7, which is reversed. The joining of one locking dog to another or more locking dogs is effected by a cold rolled connecting bar of ⅜ x ⅜ section, each dog being secured to said bar by two steel machine screws. A cover plate prevents any tendency these screws may have to withdraw.

The locking shown in the illustration applies to the safe working of a single line junction, figure 3.

The action of the ordinary locking and releasing is easy to understand, as illustrated in Fig. 2, but the special or conditional locking may be explained. Let it be understood, in the following description, that "tappet down" means that the lever to which such tappet is connected stands in the back or normal position, and that when such lever is intended to operate a signal, such signal stands at danger; and when such lever is intended to operate a switch or facing point lock, these stand in their normal positions, i. e., the switch lies in that of its two positions as has been determined is the best or most convenient usual position, and the facing point lock lies in that position which leaves free the switch it is intended to lock. "Tappet up" means the reverse of the foregoing. Referring to Fig. 2, the third space from the top contains the following special locking, viz.: 7 locks 2 when 4 is at home, but not when 4 is reversed. The tappets have the same numbers as their respective levers. The tappet spaces are lettered *a k*, and extend from one end of the machine to the other. Tappets 2 and 4 are shown "down," and tappet 7 is shown "up." *m*, *m′*, *m″* and *n*, are four locking dogs, connected as shown. *t* is a transverse sliding section of the tappet numbered 4, being rebated into that tappet which has a gap corresponding to the depth of the piece *t*. The two parts of the main tappet 4 are connected together by a back strap, rivetted thereto as shown in dotted lines. The dog *m″* is shown entered into the notch in No. 2 tappet, and said tappet is "down." Dog *n* abuts against one edge of sliding piece *t* in No. 4 tappet, which is also "down." The other edge of sliding piece *t* is notched below the locking dog *m′*, so tappet 4 must be raised "up" before dog *m′* can enter said notch. Dog *m* stands below the notch in No. 4 tappet, which is "up," so that tappet No. 4 must be dropped "down" before said dog can enter said tappet. As shown in the figure 7, being "tappet up," and No. 4 being "tappet down," No. 2 is locked. Change No. 7 to "tappet down," No. 2 becomes free; or change No. 4 to "tappet up," 2 becomes free. Or leave No. 4 "tappet down," change No. 7 to "tappet down," No. 2 to "tappet up," and 7 is locked. It is therefore shown that with No. 4 "tappet down," 7 locks 2 and 2 locks 7, that with No. 4 "tappet up," 7 and 2 are free of each other.

By a recent improvement, three connecting rods may be used for each line of dogs, as shown in top space of locking-plate, and the locking consequently occupies less than one-half the space that it did formerly.

Mr. Stearns—Mr. President, if I correctly understood the report as read, I did not notice that the Committee recommended the use of an interlocking switch of any kind. It simply recommended that the Association discuss it.

The President—That is all.

Mr. Stearns—Now it seems to me the Committee could recommend the use of some switch, as they have gone into the subject, and had more time to deliberate. I think in yards where there are a number of switches the interlocking system could be used to advantage; but in many yards where there are only a few switches, it would not be practical. If the Committee would give us a little light on that subject, I would be glad to receive it.

The President—The Committee has its blue prints here, and any gentleman wishing to inspect them can do so. We are not to adopt this report. It has only been brought up for discussion for the benefit of the Association.

Mr. Wynn—That is the way the Committee understood it—that they were to procure plans and blue prints for the benefit of the Association, to enable the members to examine them and then discuss the matter. The Committee was not instructed to recommend the adoption of any particular one.

Mr. Black—The gentleman no doubt has mistaken the object and scope of the report of the Committee. The Committee has not recommended the inter-locking switch, it recommends itself. Railroads generally, throughout the country, have adopted it. The exhibits here are only to show the members the different plans in order that they may become familiar with them.

It is only a question of time when the majority of the yards connecting with main lines will be connected by inter-locking switches. And I don't know of any device that comes more directly within the jurisdiction of Roadmasters than the inter-locking switch. The prints are here for inspection. The Stevens is an improved device; the Saxby & Farmer is an old and original machine which has been improved, and the Pneumatic is a m controlled by the pressure of air, h laid underground, about three-fourth ter. There is no lever at all, as wi ination of the blue prints. The lev lated by hand. The pneumatic devi of keys similar to the key on a tel by pressing on them the operator three switches. The moment the the switch moves over to the requ could manipulate the machine, so far Furthermore, in the pneumatic sys entire yard is laid out on a board, a switches and signals correspond wi on the keys.

Mr. Meade—I would like to ask pneumatic system is superseding the

Mr. Black—It is used on the Pe New Jersey Central, and I think is n New York Central.

Mr. Meade—How about the cost?

Mr. Black—It is much less on t than on the hand lever. The Pneum the way, being underground. With t the pipe is all above ground, and ha is quite expensive.

Mr. Meade—But the first cost of t must be greater?

Mr. Black—I think not, although answer that question.

Mr. Stearns—This pneumatic sys tirely new to me. I am familiar wit I would like to ask Mr. Black to locking is done by the pneumatic done by electricity or not? As I u are thrown by compressed air by on lever system, one lever operates the signal; the second one operates the detector bar, and the third throws the switch.

Mr. Black—The Pneumatic machine properly is interlocked by electricity. You will notice from the keys, one opens and the other closes; where, by the hand lever, when you throw the switch you throw it forward for the side track, and pull it back for the main line. Key number one opens the switch, and key number two throws it.

Mr. Ellis—Does this system in working interfere more with the track than the other system you have spoken of?

Mr. Black—I do not think there is any difference at all.

Mr. Ellis—I ask the question because that is what the Roadmasters are interested in. I have not had much experience in inter-locking switches; but since 1883 I have had charge of eighty-six Union Switch & Signal Company's signals. They were put on my road while I was there, and I know the Roadmasters are interested in the automatic signals or inter-locking signals, and must become more so in the future, as they are interested in any signal of any system that is put in operation. I notice those who are unacquainted with these new methods take longer to trace out the origin of troubles that arise. We all know that we are not going to have a surplus of men in our work, so that in the adoption of any new system of signals, automatic or otherwise, we must take an interest and guard our interests as trackmen, so that we can do the work required of trackmen in an intelligent manner, and have as much of our work go to the track as possible. I think the time is coming when you are all going to be interested in this matter.

Mr. Black—Roadmasters, in my opinion, should have charge of the inter-locking repairs when the system is put in use on their road, for the reason that inter-locking switches will create a new department under the control, possibly, of a signal engineer. Now, if there is a defect in the switch, the inter-locking repair men will come on the ground and look the matter over, and he will say the interlocking is all right, it is the fault of the switch. The section foreman comes along and mak tion, and says the switch is all righ be in the inter-locking. There is right off. One is going to throw it reason it has been my object to bri masters in Convention. I think t the inter-locking machine is under masters. I have had a great dea same matter for the reason that th interlocking from the Roadmaster not consent to it. I wanted both c reason I referred to the two differe

Mr. Meade—In the case of a uni eight or ten roads interested, h have charge of the tower man?

Mr. Black—Now, I draw the lin comes under the charge of the speaking of the repair men.

Mr. Meade—I know of instance are thrown by hand levers. The t of them. There is often a conflict man and the tower man as to wh man is employed by several roads, could have entire charge.

Mr. Black—I would not be prep tion. I suppose an agreement mig I am only speaking of outside wor

Mr. Meade—Now, another poin Where these derailment points c where you find nothing else, to h the main track?

Mr. Black—Certainly; and also

Mr. Meade—I have seen some tected by a guard-rail.

Mr. Black—If the guard-rail is bar, and it is in good order, it is i switch under a passing train.

Mr. Meade—Is it necessary to have them both?

Mr. Black—Yes, I find it necessary to have both a detecting bar and a guard-rail.

Mr. Wynn, being called upon by the Chair, said: With regard to the parties having control of the inter-locking switches, I have to say that we have a mechanical engineer who has charge of all the inter-locking and the superstructures. Of course, as Mr. Black says, when there is a derailment of the switches, my trackmen have to go and attend to that. When there is a derailment, the inter-locking men generally get there first, and they will say, "Well, the track is out of order." Sometimes we have a great controversy about that. I may go there myself, and I don't allow them to put, anything on me when it is not right. I hold my own every time. We also have several roads there connected with us in East St. Louis, and the switches are on the tracks belonging to those roads we connect with. Now, I am supposed to keep the switch in repair, where the interlocking is connected with the switch. The switch is thrown by the inter-locking movement. Of course, it is very unpleasant sometimes. My man will go to make repairs, and he will say that is not my track, this belongs to some other company, and it makes it very unpleasant. So far as the ground work is concerned, I think it would be a good idea for the Roadmasters to familiarize themselves with the interlocking system, and to have charge of the men who have to do the repair work. Of course, the man in the tower has nothing to do with the outside. If there is anything wrong on the ground, it is not the fault of the tower man; although sometimes he makes a mistake, and will throw a switch under a train right in between the trucks and make a derailment.

Mr. Meade—Would not your detecting bars prevent that?

Mr. Wynn—We do not have any detecting bars. We have done away with them long ago.

A voice—Who does your mechanical engineer report to? Does he report to you?

Mr. Wynn—I guess he reports to the Superintendent.

Mr. Black—I would like to state in regard to the mechanical engineer. He is a man who draws out the plans, and gives you the condition of the signals. He reports to the general manager or first engineer. That is what we call the signal engineer. The repair men are what we are talking about, as being under the Roadmaster. The signal engineer is the man who designs and gets out his plan.

Mr. Meade—I would like to ask if they are regular section men or regular mechanics?

Mr. Black—They have got to be mechanics to understand the business of taking charge of inter-locking affairs.

Mr. Stearns—I would like to ask the gentleman, what conclusion he has reached in his researches with reference to the merits of the track circuit and the wire circuit? Some roads have abandoned the track circuit and are now using the wire circuit.

Mr. Black—I have never gone into that matter thoroughly. I would not be able to answer the question.

Mr. Meade—I would like to ask Mr. Black if he would think it advisable to recommend any minimum or maximum distance that home and distance signals should be placed from crossings?

Mr. Black—I would leave that entirely in the hands of the mechanical or signal engineer, or the general manager. I should think it would depend largely on the condition and nature of the location of the different switches and crossings.

J. W. Clark—Answering Mr. Meade's question as to the distance which home and distance signals should be placed from crossings, I would say that is regulated in Illinois by the Railroad Commissioners.

Mr. Stearns—I would like to ask if the laws of Illinois require distance signals?

Mr. Clark—They do.

Mr. Stearns—There are places where they do not use them.

Mr. Clark—That may be true, as in many other matters where the law is not complied with. The Commissioners, as I understand, have discretionary powers to require or not require them. Each place has its particular difficulties to contend with, and the Commissioners are compelled to use their judgment.

G. E. Daggett—Do the laws of Illinois require a distance signal for every home signal that is placed?

Mr. Clark—Not for every home signal. They require a distance signal for that crossing or that track.

Mr. Daggett—If you have trains that are running by the inter-locking system, it is only at a crossing where they require a distance signal?

Mr. Clark—Yes.

Mr. Meade—Could you give us the distance that the home and distance signals are from the crossings?

Mr. Clark—The home signal is four hundred feet, I think, and the distance signal is twelve hundred feet, I think.

The motion to accept the report of the Committee was adopted, and it was left discretionary with the Executive Committee to procure electrotypes of a reduced size of the blue prints submitted by the Committee with these reports, and have the same published in the report of the proceedings of this Convention.

The report being accepted, it was carried over for discussion at the next meeting of the Association.

The Committee on Best Method of Preserving Cross-Ties asked for further time to prepare a report, which was granted.

The President—Are there any other Committees ready to report?

J. W. Craig—Mr. President, in reference to the report of the Committee on the Best Method of Instructing Section Foremen, Laborers, etc., which was referred by the Association back to the Committee, I beg leave, as a member of that Committee, to submit the original report of the Committee, for the reason that after a conference we were unable to see how we could make any change that would improve it. You all know what the report was. You heard it read and discussed yesterday, and after considering it in every way they could, the Committee has failed to see that they can change it in any shape or form.

The President—For the benefit of the members who have arrived since the report was submitted yesterday, I will ask the Secretary to read the report again.

The Secretary again read the report as originally submitted.

Mr. Black—I move that the report be accepted as read.

Mr. Craig—I second the motion.

Mr. Kindelan—Before a vote is taken on that question, I would like to say a word or two. There were some Roadmasters here yesterday who objected to the report, because it would not work well in their section of the country, while it was admitted that in a large portion of the country it would work to perfection. I think we ought to endorse that report, because the system has been found by those who have tried it, to work satisfactorily. If we can not endorse it as a whole, I think we can at least accept it.

The President—I would like to say a word in reply to Mr. Kindelan. He says he would like to have the report accepted because it applies to some portions of the country. Now if it is a benefit to one section, why not to all in time? One man may not have track sufficient to justify him in using such a gang as that report recommends; but I think it is to the interest of every Roadmaster, in order to save labor for himself, and to better his track with the least labor, to have the men all educated alike. Every Roadmaster knows what hard work he has when he promotes a new foreman, to get him educated to do the work the same as the man who was doing it. The aim of the roads being to have uniformity of work, I think if this system is a benefit to one part of the country, it will in time be a benefit to all parts of the country; and all it requires is a test to prove, as I think, that it will be a general benefit.

Mr. Meade—I would like to inquire whether appointing an assistant foreman in each gang, at an increase of pay over the balance of the laborers, is not liable to cause jealousy of the foreman himself. I have observed it in several instances to be the case. I understand that report was submitted by Mr. Craig, and he works entirely colored men down in Georgia.

Mr. Craig—I beg leave to say it was not submitted by me, only as one member of the Committee.

Mr. Meade—I accept the correction. I want these Roadmasters to understand that this apprentice gang Mr. Reed refers to as being educated for foremen, has to go out and take charge of colored men.

The President—I don't think we should bring that into the question at all. The question is as to the best method of procuring or obtaining good section men for foremen, and nothing in regard to color or nationality should be considered; nor does it refer to the question of pay at all. You are not required to give one man more pay than another. Each road can arrange the matter of pay for itself.

Mr. Meade—Does not this report recommend an assistant foreman in each gang?

The President—Yes, but it does not say you must give him extra pay.

Mr. Craig—The report recommends an increase of pay, but it does not say what the increase shall be.

Mr. Purcell—I have been foreman where there were but two others in the gang. By appointing one of those two men assistant, I would be left with two foremen and one man in the gang. That would be absurd. I am in favor of educating every one connected with the road, from the manager down to the lowest laborer. I think we all need it. But we must consider the situation in considering this report.

Mr. Daggett—I am in favor of having an assistant foreman. I adopted that plan and have worked it for some years, and have had good results. I pick out the best men

—young men—that come on the road, and at the first opportunity would put them in as assistant foremen in a section or floating gang; afterwards promoting them and giving them a section. I have had excellent results. I started as an assistant foreman myself, or rather as a track laborer, and then got the position of assistant foreman, then foreman, and finally the position I now hold. I am in favor of an assistant foreman every time.

Mr. Kindelan—I think the theory of having an assistant foreman is in perfect harmony with promotion, and can say for myself that I have seen it work, and it has worked well where there are enough men in a gang to use an assistant foreman.

Mr. Craig—I would like to hear from Mr. Perry; he has had two years' rest.

Mr. Perry—On our road we do not have assistant foremen, but we have what we call a track walker. We pay him an increase of five cents a day over the salary of the laborers. This man is picked out of every gang, and is supposed to be the best man, and when we need a foreman we take him out of the rank of track walker. Our help in Texas is poor. I don't think we could get along with the assistant foreman plan. It is all I can do to keep the sections filled up with one foreman. Sometimes I have two or three sections without anybody for several days.

The President—Possibly that is because you do not have assistant foremen.

Mr. Perry—We have track walkers, and I generally make foremen of them. We pay or men a dollar fifteen, and our foremen a dollar twenty. We work colored and white men both.

Mr. Meade—As I understood yesterday, this report was voted down. I don't see why it has come back here this morning and been accepted.

The President—It was recommitted to the Committee with instructions to report to-day.

Mr. Meade—And to-day they have reported the same thing.

The President—Yes. They say they can make no changes in it.

Mr. Meade—Are not the members of the same opinion as yesterday ?

The President—We have not come to that yet.

Mr. Daggett—I would like to ask Mr. Perry if he can make as good foremen of track walkers, who have walked the track for a year or two, as he can of men personally engaged in the work on the track every day ?

The President—If I am correct, I do not think that would have anything to do with the matter before the Convention at all. The report does not say how they shall obtain these foremen, only that he shall be the head man in the gang. It does not say what work he shall be at, only track work. A track walker would be a track man. He may work part of the day in the gang.

Mr. Daggett—As I understood the gentleman, he said he promoted him from track walker. You can hire anybody to walk the track whether he knows anything or not.

Mr. O'Neil—Mr. President and gentlemen, I am very much opposed to deputy bosses on sections. I represent the Western part of the country, and we are situated very mnch as Mr. Purcell has stated: having small gangs of men, sometimes not over a half a man to a mile, taking it on an average, so that we coudn't afford any deputies, or to have any jealousies existing between our foreman and the men under him. We allow our foreman absolute control. He hires and discharges the men under him, and the Roadmaster does not interfere. If we would have deputy bosses, we would create jealousies immediately between the foreman and those men. I will say further, we have no trouble whatever in finding foremen for our sections. We always take our men from among the laborers, and put them on sections when we have vacancies, and leave that matter entirely with the foremen.

The President—I would like to ask Mr. O'Neil if he ha tried the experiment?

Mr. O'Neil—To a certain extent, yes.

Mr. Black—Suppose you have a gang of say twelve mer and your foreman should become sick or disabled, wh would take charge of those men?

Mr. O'Neil—We would telegraph to the Roadmaster.

Mr. Black—Suppose the Roadmaster is a hundred mile away, or didn't come out at all, these men would be ou their time. So far as my opinion goes, an assistant fore man is a very good thing.

The Secretary—In my case we have three men and foreman in a gang. Each foreman has one man upon whor he depends more or less should anything happen to th foreman, to disable him from duty. This man would tak charge of the work during that day. You might say that i assistant foremanship; that is true, but that man is strictl under the control of the foreman. He can't stand ther and say to the foreman, "You didn't put me here, and will do as I please," and give that foreman maybe a day c two days' trouble before he can get communication wit the Roadmaster; and possibly in that way cause the Roac master a good deal of trouble to run down and settle th dispute. I believe each foreman should be permitted t select his own men on his section. If he is not competer to do that, get another foreman, Do not let the assistar hold his position by virtue of appointment by the Supe visor or Roadmaster. Let each foreman select his ow men, and there will be no jealousy—nothing of the sor The men then will work in harmony. I believe in increa ing the pay of the men all around, and not pay one ma more than another.

Mr. Kindelan—Mr. President, I desire to make a motio which, I believe if adopted, will obviate the objection th is made to the report, that it is likely to create jealous I move that the report of the Committee be amended so a to authorize the foreman to appoint and discharge the assistant foreman when he shall think proper so to do.

Mr. Stearns—I second the motion.

Mr. Kerwin—I would like to suggest a change where the report refers to "young men." We have a great many middle-aged men who have more ambition, and more muscle to carry out this business; and I say, promote, according to ability, from the ranks.

Mr. Craig—Yesterday, when this report was under consideration, a motion was made to amend it, and it was found that the amendment, if adopted, would kill the report—it being entirely repugnant to the entire report—and it was deemed best by the Convention to recomit the report to the Committee to report to-day. That Committee was unable to make any change in the report, and have resubmitted it to the Convention as it was. Now, before proceeding further, and in order to avoid a recurrence of that same thing, I would ask that the Secretary read the report with the amendment offered by Mr. Kindelan, in order that we may see how it affects the report.

The Secretary read the report with the proposed amendment.

Mr. Meade—I would like to ask if it is in order for me to make an independent motion with reference to that report. Many of us are dissatisfied with that report.

The President—You are out of order.

Mr. Hickey—I would move that the word "young" be stricken out of the report.

The President declared Mr. Hickey out of order.

Mr. Craig—Mr. Meade has not stated his motion. We can not tell, as a matter of fact, whether it will be in order, or whether the motion is out of order.

Mr. Meade—I would like to offer an amendment to the amendment of Mr. Kindelan, to strike out from that report all reference to assistant foremen being appointed in each section gang, with increased pay over the balance of the men.

The question on the amendment
amendment of Mr. Kindelan, on b
rising vote of 16 in favor to 40 agai

The question recurring on the
offered by Mr. Kindelan, to-wit: T
man be appointed and discharged b
by the Roadmaster or Supervisor, o
by a rising vote of 32 for and 15 aga

Mr. Kerwin—Now I move to ame
ing out the word "young."

The amendment was agreed to.

The report then, as amended, wa
follows:

AMENDED REPO

To the President and Members Roadmasters'

GENTLEMEN—Your Committee appointed
of Instructing Section Laborers, with a vi
begs leave to present the following report:

In view of the extremely low wages pai
comparison with that of men in all the ot
service, while the qualifications of a good t
class mechanic, it is desirable to overcome,
influence in some manner so as to secure m

Apprentice gangs have proved successf
Southern States as a means of encouraging
become trackmen; this want is not felt on
States, but they require to as great an exten
ment, so that the suitable men will continue
create more efficient track laborers and for
this encouragment must be bestowed loca
be felt in every gang on the road; wherea
prentice gang centralizes this encouraging i
mental to the majority of railroads.

We believe that to meet both cases the fo
quite available:

First—That there should be an assistant
floating gang, and if at all possible, selecte
on the sections, floating gangs and repair or

Second—That the assistant foreman shall
by the foreman.

Third—The assistant foreman shall work with the laborers, except when the foreman finds it necessary to leave the gang, then the assistant foreman shall have charge during the absence of the foreman.

Fourth—Should the assistant foreman be found at any time incompetent or unfit, he shall be reduced to a laborer or discharged, and another assistant foreman appointed in his stead.

Fifth—The assistant foreman shall be paid an increased rate of pay beyond that paid for laborers, according to his qualifications.

Sixth—When a vacancy occurs in the foremanship, from whatever cause, the assistant foreman shall fill the position until a foreman is duly appointed.

R. CAFFREY, Chairman,
J. W. CRAIG,
O. F. JORDAN,
WM. RILEY.

The report of the Committee on Revision of Constitution and By-Laws was called for, and it announced through its chairman, that it was not ready to report.

Mr. Doyle announced to the Convention that the steamer Idlewild would leave the foot of Griswold street at 3:30 p. m. for Star Island, where a fish supper would be served to all members of the Association and their wives, the boat to return at the pleasure of the guests.

J. W. Craig—As there seems to be no business before the Convention at the present time, the committees being out and working on their reports, I have an address which I would like to deliver to the Convention.

The President—There being no objection, the gentleman will proceed with his address.

Thereupon Mr. Craig addressed the Convention as follows:

ADDRESS OF J. W. CRAIG.

To the Roadmasters' Association of America:

I beg leave to submit, for your information, the following statistics of railroads in the United States as compared with the railroads in foreign countries:

The railroads have been great developers of this country. They have done more, perhaps, than any other agency to make it what it is. As it is the greatest nation in the world, so has it the most magnificent system of railroads. No other nation can compare with it in the number of miles of road; and, in fact, the mileage in the United States is not very far from being as great as that of the rest of the world combined. Our roads possess superior advantages for long distance travel, and the cost of travel is less than in other countries. A first-class ticket in the United States costs one-half less per mile than it does in England, and may be purchased for less than second-clais tickets cost in any part of Europe.

The number of miles of railroad in the United States at the end of 1889, was 160,000, and the number of people employed by the railroad companies was 900,000. In addition, 500,000 people were employed in the factories, etc., connected with railroading. Estimating that each one of these employes must support three persons—at low estimate—there were in this country at that time 5,000,000 people dependent for a living on the railroads. The earnings of the companies were $33,000,000 greater than in 1886, and the passenger and tonnage traffic 15 per cent. greater.

Statistics for the close of the year 1887 show that there were in round numbers 342,000 miles of railroad open for traffic. Of these, America had 177,000, or more than half; Europe, 130,000; Asia, 17,000; Africa, 5,000, and Australasia something over 9,000. Of the railroads in America just about five-sixths were in the United States, which had 150,000 miles. British America had 12,000, and Brazil, Mexico and the Argentine Republic from 4,000 to 5,000 each. Of the Asiatic railroads, over 14,000 miles were in British India; the Trans-Caspian Railroad and those in the Dutch possessions being the most important among the others. China had practically no railroads in operation, but Japan had nearly 500 miles. In Africa, the leading railroad system is that of the Cape Colony, with nearly 2,000 miles in operation. Egypt, Algiers and Tunis also have considerable systems, but the central part of Africa is almost entirely undeveloped. The oldest Australasian systems are those of New South Wales, Victoria and New Zealand, each of which now has about 2,000 miles of railroad. The other Australian colonies are beginning to develop rapidly.

In Europe, the country with the greatest absolute mileage is Germany, with nearly 25,000 miles, followed by France with 21,000, Great Britain with not quite 20,000, Russia with a little less than 18,000, and the Austrian Empire with 15,000. The country with the largest mileage in proportion to area is Belgium, which has, in round numbers, one mile of railroad for every four square miles of territory. England alone would probably have about the same proportion, but Great Britain and Ireland have only about one mile of railroad to every six square miles of territory. If the comparison is made with population, France has a slightly larger per capita mileage than either England, Belgium or Germany; but that of the United States is more than four times as high as France, while the showing in Australia is even a trifle better than ours.

A striking thing about these statistics is the amount of increase in recent years. One-third of the railroad mileage in the table was constructed since the close of 1880, the increase in these seven years being not very much less than in the twenty years immediately preceding.

Just about half of the increase has been contributed by the United States. The most rapid percentage of increase is, of course, found in the newest countries like Australia. If we confine our comparisons to the last four years, we find that while Europe has increased only thirteen per cent., and the United States twenty-six per cent., Australia shows a growth of about forty-eight per cent. The capital invested in railroads has probably not increased quite as fast as the mileage. A careful, although necessarily somewhat uncertain estimate, makes the average cost of railroads in Europe about $113,000 per mile, and that in other parts of the world about $59,000; indicating that the total investment, as nearly as can be ascertained, is $27,000,000,000, rather more than half of it in Europe.

Mr. Craig--These figures I have given are not absolutely correct, but are as nearly correct as I have been able to get them.

On motion of Mr. Kindelan, the Convention unanimously accepted the address, and ordered the same printed as a part of its proceedings.

Mr. Craig--I would like to ask what action was taken about the badge. It was left in the hands of a committee appointed at Denver.

Mr. Black-- I believe that matter was brought up at Pittsburgh, and it was decided to leave it with the President and Secretary and Treasurer.

The President- I received a letter on Friday evening at Indianapolis. I was very busy and had no time to examine into the matter.

Mr. Meade--Mr. President, it is eight years since this organization started. There are several conventions now in session, here in Detroit, and you will find every one with some sort of badge, and I don't think we ought to postpone that matter any longer. As Mr. Black lives in the largest city and has the best opportunity for seeing a variety of designs, I move that he be appointed to select a badge for the Association.

Mr. Craig -I will amend that by authorizing him to submit a design for a badge to this Association at its next meeting.

Mr. Meade--I will accept the amendment.

The motion as amended was c

The Secretary—I would like connection, for my own benefit. small town, and yet near enou there occasionally. I had inten good jewelers there, and get de The time for our meeting drew spare the time to go to Indiana dent to attend to the matter, b didn't receive my letter until it

Mr. Doyle announced that the the Michigan Central Railroad C Association, would leave Detroi for Niagara Falls.

The Convention took a recess

Afternoon Session.

The Convention was called to order by President Sloan at 1:30 p. m.

The report of the Committee on The Best Method of Preserving Cross-Ties was called for and reported, through its chairman, Mr. Reed, as follows:

REPORT OF THE COMMITTEE ON THE BEST METHOD OF PRESERVING CROSS-TIES.

To the President and Members Roadmasters' Association of America;

GENTLEMEN—Your Committee, which was appointed only on yesterday to report on the Best Methods for Preserving the Life of Cross-Ties' find that the subject, so far from being one that can be digested and reported upon within the short time allowed, is one that requires months of careful investigation; and for this reason a permanent Committee should be appointed to take it in hand. However, preliminary to the work of such a Committee, we respectfully submit the salient features of a paper which was prepared by the Chairman of this Committee for another occasion, but which, we may add, was never placed in print. This paper may go into unnecessary detail as to the causes of decay, but your Committee is of opinion that it will form an excellent groundwork of information for subsequent inquiry.

At the outset of our investigation into the characteristics of the various means which have been employed from time to time for prolonging the life of timber, we are confronted with a mass of chaotic and apparently conflicting results of investigations and experiments, and views of eminent authorities that are calculated to leave the novice as much in confusion as he was formerly in the dark.

The gradual destruction of timber by decay is described by Liebig to "eremacausis or a slow combustion," by oxidation. Pasteur ascribes decay to the action of living germs in the atmosphere. Prof..Tyndal sustains the view of Pasteur in a series of experiments, when he found that by placing putrescible materials in a tube and excluding the air, which is laden with clouds of living germs, or agents of decomposition,

that putrefaction ceased indefinitely, or unti
posed to the atmosphere. This is the moc
theory, and conforms very nearly to the re
For it has been determined by repeated e
preservative of timber must not only posses
coagulation of albumen, and power as a
possess the mechanical property of the ex
filling the pores and surrounding the fibre
trable by the atmosphere. The atmospheri
additional support in the fact that timber
not decay ; that which is constantly dry de
the coagulation of the albumen ; timber t
decays less rapidly than by any other t
means, due more to the thorough coagulati
ber subject to alternate dryness and moist
ing doubtless to the intermittent softening a
substances of the timber, thus rendering it
atmosphere.

Having endeavored to accept a reasona
decay, which will harmonize with the resul
ment, we will proceed to investigate the re

Experiments with various processes of ti
conducted for centuries, but proprietary pr
the applications of certain antiseptics, hav
last century, and principally within the rai
patents have been issued within the Unite
proved failures on trial.

There are four situations which requir
preservatives used. These situations are—

1. Submersion in water, and subject in s
Navalis, and other sea worms.

2. Exposure to alternate moisture and dr

3. Exposure to the atmosphere only.

4. Situated so as to be exposed to transv

Of the many preservative agents empl
resolved into two classes, viz.:

1. Those derived from the distillation, a
table tars, albumenous and oily substances.

2. Those having a mineral acid as a base

3. Any modification or combination of th

Under the first head we have creosote as
capable of resisting, for an indefinite tim
destruction by atmospheric germs, and of
timber in its normal condition and strength

Thus creosoting is the only process known that successfully meets *all* the requirements of a wood preservative. Only one element, the expense, militating against it. The value of creosote as a wood preservative is attributed, by an eminent English authority, Samuel S. Bolton, to the presence of acridine, "an intensely acrid and pungent substance," and "one of the alkaloids or bases" of creosote oil, and of napthaline, a substance less volatile than the tar acids, which is recognized in the thick yellow appearance that is given to the outside of creosoted timber, and which afterward becomes darker by exposure to the atmosphere; these, Mr. Bolton, as well as other English scientists agree, are more powerful as permanent preservatives than the tar acids that are shown to be more active at first in coagulating the albumen, but exceedingly unstable, entirely passing away in a comparatively short time, while acridine and napthaline remain to permanently seal the approaches, both chemically and mechanically, against the destructive attacks of atmospheric germs; these substances are among the residual products after distillation of coal tar, at a temperature exceeding four hundred and fifty degrees Fahrenheit. There is some question relative to the comparative value of coal tar creosote, or dead oil, and wood creosote. We have been unable to learn of any experiment of the latter of sufficient duration to demonstrate its comparative value. But we are of the opinion that by observing the same rules in the use of the products obtained by distillation at high temperature, we will arrive at about the same results as in the use of dead oil. If such proves to be the case, we can expect to purchase creosote oil at much less than the present rate of one cent per pound.

Under the second head we have the processes of -

Kyanizing, treatment with corrosive sublimate,

Burnettizing, the use of chloride of zinc,

Bouchere, the use of sulphate of copper.

The patents on these materials, as applied to preserving timber, have long since expired. Thus we are at liberty to use any of them without royalty, provided we do not infringe upon various patented methods of their application, which will be mentioned further on.

Kyanizing, (chloride of mercury), was patented in 1832. The earliest recorded experiment was made in 1838, on chestnut ties, which were in good condition eleven years afterward. From that time on the American Society of Civil Engineers possess authentic records of sixteen different experiments, about one-half of which were favorable up to about twenty years. The salts were introduced by steeping the timber in solutions of three per cent. strong by weight. From four to five pounds of the salt, per 1,000 feet, b. m., is considered sufficient; with the salt at fifty cents per pound, the cost of Kyanizing is estimated at from twenty-five to thirty-two cents per tie. This process has been recommended for timber entirely protected from moisture, (other than atmospheric moisture), but owing to the fact that corrosive sublimate is partially volatile, at ordinary temperatures is readily liquified, and is a deadly poison, invariably injuring the workmen engaged in preparing it, and that it is said to render the timber brittle, it is generally considered objectionable as a preservative for ordinary use.

Next in point of age is Burnettizing. Chloride of zinc when used in large quantities, as a solution over three per cent. strong, injures the elasticity and strength of wood seriously. The usual strength is 1.91 to 2 per cent. Another objection is that chloride of zinc is easily soluble in water, and, therefore, for these two objections it is manifestly unfit for bridge timber ; applied to cross-ties it serves a better purpose, as in that situation it has no transverse strain to resist, and is not readily washed out ; but an objection occurs even here, as the ties are liable to crack and split under the rays of the sun. The cost of this system is from fifteen to twenty-five cents per tie. A report of a Committee to the American Society of Civil Engineers, June, 1885, recommends Burnettizing as the best method for preserving cross-ties.

The Bouchere process, with sulphate of copper, has been tried extensively both in this country and in Europe. This process is a failure as against the *Teredo* or other sea worms, and renders the wood very brittle ; but as a protection to timber exposed to the atmosphere, it seems to have been successful in a few cases and a partial failure in others. The process of application consists in forcing the liquid, (made one per cent. strong), into the large end of the timber while green by means of hydraulic pressure. As sulphate of copper has a destructive influence on iron, it would not be practicable to apply it in enclosed iron cylinders, as at present seems to be the most successful process of application, and if copper cylinders were used the plant would be more expensive than the value of the process would seem to warrant.

Under the third heading we will mention a modification of the Burnettizing process, which was patented by Mr. Wellhouse, and has since been extensively employed at several places, notably on the A., T. & S. F. R. R. This process consists, first, of an application of chloride of zinc with a little glue added, followed by a solution of tannin, " which, it is claimed, forms upon coming in contact with the glue small pellicles or films of insoluble artificial leather, which plug up the mouths of the sap ducts so as to prevent the zinc from washing out." This process has been employed only since 1879, and its merits are yet to be demonstrated.

While we find that creosoting is the most perfect, it is at the same time the most expensive method of timber preservation, and consequently it becomes desirable to form such a combination as will cheapen the process without decreasing the efficiency. This we believe may be done for cross-ties by employing sulphate of zinc, (Burnettizing)--which readily seeks the center or heart of timber, and does not readily return to the surface again--as the first material to be injected ; and next to inject creosote as an outer covering or protection. By this means we will obtain a valuable result at minimum cost. The creosote will overcome the tendency of the sulphate of zinc to wash out, or volatilize, and will also neutralize the tendency of the timber to surface crack, as when the zinc alone is used; while the zinc will thoroughly protect the interior of the timber. Just how much the cost of creosoting can be reduced by this process only actual experiment can determine. It has been shown that Burnettized timber rots first on the outside, and creosote timber begins to decay on the inside. Thus the combination should be more perfect than either one alone.

In all works on the subject we find it insisted that open grained or sappy, or thoroughly seasoned timber alone should be used, for the reason that such timber absorbs the preservative solution after the sap is partially removed by seasoning.

Many processes of *applying preservative agents* have been resorted to, from the ordinary paint brush through the various stages of steeping, vital suction and application by hydraulic pressure, to the more perfect means of exhaust and pressure within a closed iron cylinder. This latter method excludes sulphate of copper and corrosive sublimate, which have a deleterious effect on iron. Thus Kyanizing has to be carried on by the steeping process, the timber being placed in vats or tanks, thus rendering this process very tedious. Sulphate of zinc and creosote may be applied in a closed cylinder successfully, and to that method we will refer particularly.

This process consists essentially in an iron cylinder with a door at one or both ends, and a track running into or through it for the handling of timber. The doors may be closed air tight, and the cylinder is connected with a tank holding creosote oil, (or other preservative), and with exhaust and pressure pumps. After the timber is placed inside and the doors are closed tight, the air is first exhausted and the sap drawn off, then the creosote is admitted, and finally a pressure is applied to force the oil into the timber. This is the process in simple. It is elaborated and improved upon in various ways. By steaming the wood three objects are gained: First, the pores are more thoroughly opened and the sap more thoroughly withdrawn; second, the fibres of the wood are preserved against the destructive action by the high temperature of the creosote admitted, which temperature is essential to thorough saturation, as creosote at a temperature of 125° and nnder is exceedingly sluggish and will not enter the wood thoroughly; and third, the steaming coagulates the albumen. The steaming is also valuable in the case of sulphate of zinc, but the heating of the zinc is unnecessary and undesirable. Another method of treating timber is by charring it within closed iron cylinders; this process is patented and is yet on trial. It seems to possess merits of coagulating the albumen rapidly, and of placing another exterior barrier against destructive action, as it is well known that charring the outside of timber without the aid of other treatment will materially increase its life. This method, however, is not recommended, as the steaming processes seem to possess all the merits of simplicity and efficiency.

In conclusion, while we have not undertaken to state in great detail all of the many points that are essential to the thorough execution of any of the processes noted, we do claim that with the aid of such authorities as S. B. Bolton, Dr. Tyndal and T. M. Britton, of England; and the Committee of the American Society of Civil Engineers, headed by Mr. O. Chanute, we have presented a fair and accurate outline of the subject, that will serve as a guide or starting point for future investigation.

H. W. REED, Chairman.

Mr. Reed—There is another process used in preserving ties on certain railroads; it is the process of Vulcanizing. There is an article on that subject printed in The Railroad Gazette, which is short and I wish to read it through. It is not embodied in this report.

Mr. Craig—I move the article alluded to be included in the report.

Carried.

Mr. Reed read the article alluded to as follows:

THE "VULCANIZING" METHOD OF TREATING TIMBER.

[From Railroad Gazette, September 5, 1890.]

We have repeatedly in the past given brief descriptions of the method of treating wood for preservation, and for its improvement in various respects, by the process known as vulcanizing, and have also given from time to time some notes of the application of this process to timber for ties and other purposes on railroad structures.

The process is the simplest of all preservative processes; but it may be well to briefly explain what it is. It consists entirely in subjecting the timber to heat under pressure. The heat to which the timber is subjected and the pressure depend upon the kind of timber treated, its condition and the results to be obtained. The intense heat produces a chemical change in the non-fibrous elements of the wood, which combine to effectually fill the pores with the compound thus created. The air pressure serves to force this natural compound through and confine it within the fibre, greatly increasing the density of the timber when allowed to become cool, and also increasing its strength, both transversely and under compression. The change which takes place in the sap may be understood from the following letter from Professor Chandler:

SCHOOL OF MINES, COLUMBIA COLLEGE,
NEW YORK, Feb. 25, 1890.

SIR. I have examined the sample of oak wood preserved by your process, which you placed in my hands.

I find that it is entirely different from the original wood, of which I also examined a sample. The treatment to which the oak has been exposed has effected a radical chemical change in its character, and it now contains 11.91 per cent, of materials, most of which have resulted from the action of heat. These I have succeeded in separating into

Neutral oils, turpentines, etc	0.36	per cent.
Phenols	0.77	"
Resinous acids and other bodies	10.78	"
	11.91	"

A very considerable portion of this 11.91 per cent. of material consists of antiseptic and preservative substances which will act to protect the wood from decomposition and decay. They have also radically changed the appearance of the wood, producing what would have otherwise required a long lapse of time. The wood before treatment does not contain the above mentioned substances, and would be liable to be attacked by microscopic fungi, and to undergo decay when exposed to air and moisture.

In conclusion, I would say that your process seems to be a remarkably simple and effective one for improving the appearance and very greatly increasing the durability of timber, and protecting it from the agencies which result in destroying, by decay, timber which has not been treated.

To Mr. Samuel E. Haskin, Etc. C. F. CHANDLER, Ph. D.

40 WALL STREET, NEW YORK CITY.

The effect of the treatment upon the strength of the timber appears from a report of some quite extended tests made at the Stevens Institute under the direction of Professor Thurston. Specimens of yellow pine, treated and untreated, were subjected to compression tests in the Olsen machine, and to transverse stresses in the Fairbanks machine. The results, as detailed in the report of these tests, are summed up thus by Mr. A. P. Trautwine, who signs the report: "They establish the general fact that, so far from weakening the wood, the process of vulcanizing seems to strengthen it, the modulus of rupture by transverse stress being 21 per cent. higher and the crushing strength increased 23.6 per cent."

Timber so treated is being used extensively on the Manhattan Elevated Railroad of New York, and the results are briefly given in the following letter from Mr. Sloan:

MANHATTAN RAILWAY COMPANY,
Chief Engineer's Office,
NEW YORK, March 1, 1889.

COL. S. E. HASKIN,

DEAR SIR: In reply to your inquiries as to the life of the cross ties and planking which had been treated by the vulcanizing process which we placed on the structure six years ago this month, I have to say the timber is sound and the surface of the ties and planking very hard.

There are no indications of decay at the ends of those planks which were vulcanized, while the planks not treated, and placed on the structure about the same time, are decayed at the ends or where they are nailed the supporting timbers. I am inclined to think the process of vulc izing will soon be found to be the best way of preserving timber.

ROBT. I. SLOAN, Chief Engineer.

The process is said to be effective also against the ravages of the sl worm. We know of no actual tests made to establish this fact, bu would seem probable that it is a fact.

The density and homogeneousness of the timber so treated and rich color imparted to it make it highly satisfactory for cabinet w and interior finish, to which purposes it has been very extensively appli It has also been quite largely used in pianos. The process is rapid, timber being treated in from 10 to 24 hours, at the end of which tim is in such condition that it is impervious to moisture and proof agai the agencies which cause decay. Lumber treated by this process been extensively used by some of the largest builders of New York, in some of the finest of the recent buildings. Testimonials from th who have used it for such purposes speak of it as being highly satisf tory in every way, while the experience of the elevated railroads of N York City, as given in the letter quoted above, is sufficiently favora to warrant a thorough trial of the method on surface railroads. process is controlled by the Haskin Wood Vulcanizing Co., office Ro 65, 42 Wall street, New York City.

Mr. Black--I move that the report of the Committee adopted without debate.

The Secretary—I move to amend that motion to this exte that the report be accepted and laid on the table for d cussion at our next meeting. The matter contained in th report is too weighty to receive proper attention at th meeting, and yet is of such a nature that we do not wish put ourselves on record as accepting the report without d cussion, and without proper attention. I move, therefo that the motion be amended to read that the report be a cepted and laid upon the table, the same Committee bei continued over until the next meeting of this Convention

Seconded.

Mr. Black—Under the conditions which we are worki to-day, I will accept that amendment, provided the Co mittee be continued, as they have gone thoroughly over th subject.

Mr. Craig—If that report is laid upon the table for d cussion at our next meeting, it will place it beyond the rea of those who are here now and who may not be at the next Convention to discuss it. I was about to move to receive the report as information, and let it be a part of the proceedings of this meeting, not to adopt it, but to receive it as information. Idon't think our brother Roadmasters should be deprived of the privilege of inspecting it. I offer this as a substitute, that the report be received as information and printed in our proceedings.

The substitute, as offered by Mr. Craig, was accepted by Messrs. Black and Ramsey, and being put to the Convention was carried unanimously.

Mr. I. Burnett introduced to the Convention J. B. Gilchrist, of the Union Pacific Railroad, who extended the courtesies at Denver to the Association, and on its trip through the mountains of Colorado.

Mr. Gilchrist was earnestly invited by the Association to accompany it on its trip to Niagara Falls.

Mr. Gilchrist said: Mr President and gentlemen, I am very glad to be with you this afternoon and to-morrow, as a member rather than a guest of the Roadmasters' Association, and I hope we shall all have a pleasant time. I am very sorry I could not be present with you at the opening of your meeting to participate with you in the proceedings; but it is better to be late than never. I am glad to be here now.

Mr. Kindelan— I move that we add to the Committee on the Best Method of Preserving Cross-Ties three more members.

Mr. Reed— Mr. President, I thought that Committee, when the report was received, was discharged.

The President— That Committee does not continue any longer.

Mr. Kindelan— Then I will withdraw my motion.

The President called for the report of the Committee on the Revision of the Constitution and By-Laws, and Mr. Burnett, its Chairman, announced that the Committee would not be ready to report until the next meeting.

Mr. Craig—Then, Mr. President, I move that the matt
be laid on the table and the Committee be discharged, an
that this matter be brought up at our meeting next year.

Carried.

The Committee on Resolutions, through its Chairma
Mr. Meade, asked for further time in which to report. Th
Association directed the Committee to prepare suitabl
resolutions and hand them to the Secretary, which was don

RESOLUTIONS.

WHEREAS, It has pleased God, the all-wise disposer of human affair
to remove from our Association by death our brother Roadmasters,

JAMES McDONALD, J. R. STEELE,
J. F. MORGAN, A. BANKSAM,
P. PETERS, JOHN GAFFNEY,
W. J. McMILLAN,

during the year since our last meeting; therefore, be it

Resolved, That we regret the removal of our brothers from our mids
missing their presence and practical words at our annual meetings. Th
the hearty sympathy and co-operation of this Association is hereby e
tended to their families, who will miss and mourn their loss more an
more as time rolls on.

Resolved, That the Secretary send a copy of these resolutions to th
families of our deceased brothers.

WILLIAM F. ELLIS,
W. H. STEARNS.
J. A. KERWIN,
J. M. MEADE,
JOHN TUDHOPE.

DETROIT, Mich., Sept. 11, 1890.

WHEREAS, Our brother, W. B. Throop, having been promoted to
higher position, it is

Resolved, That, although we regret the loss of our brother by resign
tion from our Association, the good wishes of the Association are e
tended to him that he may succeed in his new position.

That the Secretary notify him of these resolutions and enter sam
upon the records.

W. F. ELLIS.
W. H. STEARNS,
J. A. KERWIN,
J. M. MEADE.
JOHN TUDHOPE.

DETROIT, Mich., Sept. 11, 1890.

List of Visitors at Annual Convention, Detroit, Mich., September, 1890.

Adams, Mrs. A. B.
Adams, Miss Clara
Burnett, Mrs. Lou.
Bentley, Mrs. H. H.
Barmon, Mr. J. F.
Brunk, Mrs. T. J.
Barrett, Mrs. P. W.
Conner, Mrs. W. H.
Collum, Miss Anna
Courtney, Mrs. W. H.
Courtney, Miss Anna
Crowley, Miss Nellie
Conley, Mr. and Mrs. P.
Connell, Mrs.
Doyle, Mrs John
Doyle, Miss Josie
Doyle, Miss Mamie
Doyle, Mr. J. W.
Dickson, Mrs. S. B.
Dennis, Mrs. D.
Diddle, W. G.
Ennis, Mrs. John
English, Mrs. Maggie
Elliott, Mrs.
Elliott, Miss
Gallerneaux, Mrs. F. X.
Gallerneaux, Miss Emma
Hildebrand, Mrs.
Houghton, Miss
Hanover, Mrs. H. D.
Houghton, Mrs. R. A.
Houghton, Miss Carrie
Houghton, Miss Minnie
Hickey, Mrs. T.
Hildebrand, Masters Willie and Alonzo
Jordan, Mrs. O. T.
Jones, Mrs. T. D.
King, Mrs.
Kerwin, Edward
Laken, Miss Daisy
Laken, Mr. D. L.
McDonald, Mrs. S. E.
McEntaffer, Mrs.
McCoy, Miss M. S.
Newsom, Mrs. George
Purcell, Mrs.
Riley, Mrs. W.
Ramsey, Mrs. Joseph
Ramsey, Mr. Joseph
Reed, Mrs. H. N.
Reuffus, Mrs.
Ross, Mrs. R. M.
Ross, Miss Jean
Sharpe, Mrs. Inez E.
Sharpe, Miss Gussie
Sloan, Mrs. John
Sloan, Mrs. John
Sullivan, Miss Emma
Sullivan, Thomas
Snow, Mrs.
Smith, Mrs. J. C.
Taubken, Mrs. J.
Weaver, Mrs. Ben.
Wynn, Mrs. J.
Wright, Miss Nettie I.
Wright, Mrs. J. W.
Wright, Miss Chrissie

The President—Has any gentlemen any business he desires to bring before the Convention? If not, we will proceed to the election of officers.

James Sloan--Mr. President, I move that the Executive Committee be allowed their expenses while at Pittsburg on official business of the Association, and arranging for this meeting.

Seconded and carried.

The President—If there is no other business before the Convention, we will now proceed to the election of officers

Mr. Craig—Mr. President and Gentlemen of the Roadmasters' Association of America: I desire to place in nomination for President of this Association the name of Mr. John Doyle. [Applause.] Mr. Doyle has been with us, as you all know, since the organization of the Association. No one has taken more interest in the Association than he, and I think we can do no better than to confer upon him the office of President of this Association. You all know him as well as I do; and I feel satisfied if elected he will carry the Association through all right.

Seconded.

Mr. Doyle—Mr. President and Gentlemen of the Roadmasters' Association of America: I am thankful for the honor Captain Craig has conferred upon me in proposing my name for President of this Association. The position I regard as one of honor; but with the work I have on hand I do not think I could properly perform the duties required of a President of this Association, and I will be compelled to most respectfully decline.

Mr. Black—I believe it is not proper for a man to decline until we have voted on the question. Until then he has nothing to say in that matter.

Mr. Burgwin—When a nomination is before the convention, the name can not be withdrawn without the consent of the Convention.

Mr. Kerwin—It has been customary for our officers to serve three terms. This is necessary to give especially the presiding officer an opportunity to become acquainted with the members and the work, and to accomplish what he may desire. I therefore nominate Mr. John Sloan, who has served us well heretofore, and will serve us well in the future.

Seconded.

On motion, the nominations for the office of President were declared closed.

J. W. Craig, by request of the President, took the chair, whereupon a ballot was taken, and the Secretary announced the result as follows:

John Doyle	32
John Sloan	29
H. W. Reed	1
Total ballots cast	62

Necessary to a choice 32.

The Chairman—Mr. Doyle is elected President of the Roadmasters' Association. [Applause.]

Mr. Craig retired from the chair, which was assumed by President Doyle.

A speech from President Doyle was loudly called for, and he responded as follows:

Gentlemen of the Roadmasters' Association of America: I do not feel in a condition to make you a speech this afternoon, but I must thank you for the great honor you have conferred upon me in electing me as President of the Roadmasters' Association of America—an Association which I candidly think is in importance second to none in the nation. Where is a more important set of men? Gentlemen, we are the watch dogs of the very foundation and structure of the great roads over which the public travel throughout the length and breadth of this country and the reason we are permitted to come together and hold our conventions is because the General Managers and Chief Engineers of these great roads and lines of travel appreciate what our duty is. And, recognizing this, they desire us to get together and post ourselves. They know it is a benefit to the companies they represent. I will not take up your valuable time in attempting to make a speech now, but I will assure you at our next convention, I will make a speech to you that you will think came from Senator Evarts, of New York. [Laughter and Applause.] Gentlemen, as I said before, I thank you for the honor you have conferred upon me.

Three cheers were given for President Doyle.

The next thing in order being
President, the names of George
W. H. Stearns were presented.
was as follows:

Brown.........
Meade.........
W. H. Stearns.........
James Sloan.........

Mr. James Sloan positively wi
Mr. James Sloan was declared
A second ballot resulted in th
as First Vice President; he rec
vote of 61.

The next thing in order bein
Vice President, the names of D
James Sloan were presented, r
cast. Necessary to a choice
Kindelan received 18; J. [illegible]
Sloan received 30; and [illegible]
elected as Second Vice President

President Doyle announced th
would soon leave for the Island.

Mr. [illegible]
turn of [illegible]
finish [illegible]

Carried.

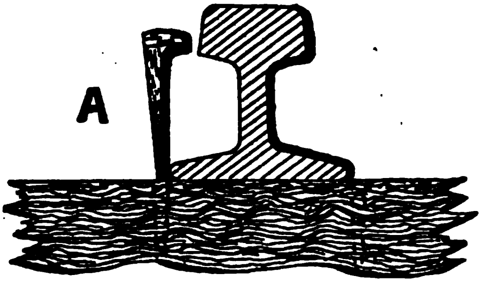
SERVIS RAIL-ROAD · TIE · PLATE

COMBINES SAFETY & ECONOMY

Dunham Manufacturing Co.,

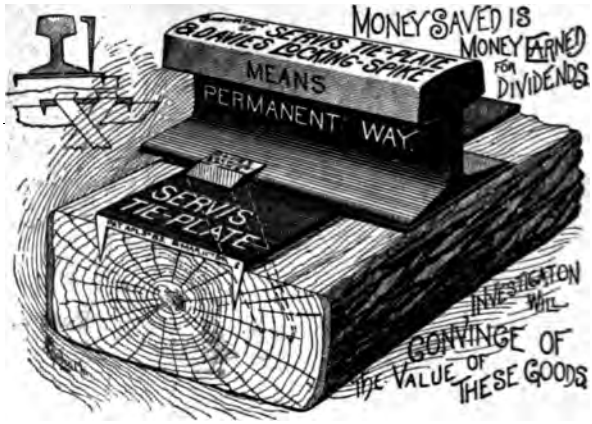
SOLE MANUFACTURERS,

General Offices: CHICAGO, ILL.



DAVIES LOCK SPIKE

Servis * Railroad * Tie * Plate.


SERVIS TIE-PLATE & DAVIES LOCKING-SPIKE
MEANS
PERMANENT WAY.
MONEY SAVED IS MONEY EARNED FOR DIVIDENDS
SERVIS TIE-PLATE
INVESTIGATON WILL CONVINCE OF THE VALUE OF THESE GOODS

CORRESPONDENCE SOLICITED.

DUNHAM MANUFACTURING COMPANY,

703-707 **Phenix Building, CHICAGO, ILL.**

Evening Session.

The Convention was called to order by President Doyle at 10:30 p. m.

The first thing in order being the election of a Secretary, James Sloan put in nomination the name of John P. Ramsey, which was promptly seconded.

J. A. Kerwin put in nomination the name of J. W. Wright.

J. W. Craig put in nomination the name of J. M. Meade.

Mr. Meade declined, but was declared out of order. He thereupon put in nomination the name of H. W. Reed.

The first vote resulted in no choice. On motion the two names receiving the lowest number of ballots were dropped.

The second ballot resulted in total vote of 53, of which Mr. Ramsey received 32 and Mr. Reed 21.

On motion of Mr. Beatty, the election of Mr. Ramsey was declared unanimous.

Mr. Ramsey thanked the Convention. He looked upon it as a vote of confidence, and that the errors found in the report of the last meeting were not attributable to him. That it always had been and would be his aim to do the very best he could for the interest of the Association. That he was glad to have an opportunity to do better in the future.

The Convention selected C. E. Jones, of the C., B. & Q. Railway, as a member of the Executive Committee for three years, in place of Richard Caffrey, whose time expired by limitation.

The next thing in order being the selection of a place for the next meeting, the cities named were St. Paul, Minn., San Antonio, Texas; Minneapolis, Minn.; St. Louis, Mo.; Richmond, Va.; Chicago, Ill.

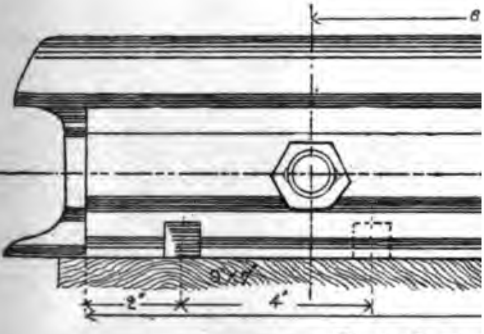
On the first vote 57 ballots were cast, resulting in 25 for Minneapolis, 18 for Chicago, 5 for St. Louis, 5 for St. Paul, 3 for Richmond and 1 for Denver. There being no choice, on motion, all but the two highest were dropped. A second ballot resulted in Minneapolis receiving 37 votes, and Chicago 22; and the Chair announced Minneapolis as the next place of meeting.

A vote of thanks was extended to Mr. Meeker for his kindly invitation to the Association to meet in Minneapolis, and for his efforts to secure that result.

A vote of thanks was then extended to the local press for their full and accurate reports of the proceedings of the Association; to the local supply men for their courtesies; to the Michigan Central Railroad and O. F. Jordan; to the Pullman Palace Car Company; to the hotels of Detroit; to all roads that recognized the credentials of members of the Association; to Mayor Pingree for the use of the hall owned by him, for the purposes of the Convention; and to the retiring officers.

On motion of J. W. Craig, the Secretary and Executive Committee of the Association were instructed to reply to the Mayor's address to the Association.

On motion, the Convention adjourned to meet at Minneapolis, Minn., on the 10th day of September, A. D. 1891.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APPENDIX.

Report of Committee on Standard Track Joints, submitted at the Washington Convention in 1888, and endorsed at the Denver Convention in 1889:

MAJORITY REPORT.

The undersigned, a majority of the Committee on Standard Track Joints, beg leave to submit the following report: That the best device now known to them for a standard joint is the angle bar. That this angle bar should be from 42 to 44 inches in length, with slots for spikes 2 and 6 inches from the ends, with six bolt holes, spaced from 6 to 7 inches apart, resting on three ties, 9x7 inches and 8 inches apart, weight 60 pounds per pair for a 60-pound rail, and increased proportionately for increased weight of rail, shape to conform to the head and flange of the rail, allowing about 3-16 inch space between the splice and the web of the rail, to permit of tightening. The cross section of joint shown by figure 6, page 28, of annual report for 1887, meets our views as to shape and fit. The bolt holes in both plates should be oblong in form, and round or button head bolts, elongated under the head to fit the oblong hole in the plate to be used. For rails weighing from 60 to 70 pounds per yard, a splice bolt ¾ of an inch in diameter, with a square nut of the proper size, should be used when practicable; and for rails weighing over 70 pounds per yard a bolt ⅞ of an inch in diameter of the same form should be used, and a metal washer or spring should be used between the nut and the plate. As far as we now know we are in favor of giving the angle bar, made heavy in the center and tapered towards the ends, a more extended trial before deciding on its merits over one of a uniform thickness throughout. That we decidedly prefer a supported joint to what is generally known as a suspended joint.

P. NOLAN,
A. B. ADAMS,
T. HICKEY.

CONSTITUTION AND BY-LAWS

OF THE

Roadmasters' Association of America.

CONSTITUTION.

Article No. 1.

The name of this organization shall be the Roadmasters' Association of America.

Article No. 2.

The officers of this Association shall be a President, First Vice President, Second Vice President, Secretary and Treasurer, and the Executive Committee, consisting of seven members, including the President, Vice Presidents, and Secretary and Treasurer *ex officio*. The President shall be Chairman of the Executive Committee.

Article No. 3.

The officers shall be elected by ballot, and a majority of all the votes cast will be required to elect. No officer will be elected for more than three consecutive terms of one year each, except members of the Executive Committee. They shall be elected one for one year, one for two years, and one for three years. At the regular annual meetings hereafter one member shall be elected for three years.

Article No. 4.

The President, or, in his absence, one of the Vice Presidents, in order of election, shall preside at all meetings. In case of absence of both President and Vice Presidents, the members may elect a President *pro tem.*

Article No. 5.

The office of Secretary and Treasurer shall be invested in one member.

Article No. 6.

The Secretary and Treasurer shall keep the records of the Association and of the Executive Committee. He shall conduct all correspondence, issue notices of the Association and the Executive Committee; shall collect all fees and dues and keep the accounts, and be charged with all the funds of the Association, and disburse them under the direction of the Executive Committee. He shall, at the annual meetings, or at any other time if required by the Executive Committee, furnish a statement of the fees or income and expenditures of the Association.

Article No. 7.

All bills against the Association must be approved by the Chairman of the Executive Committee before they shall be paid.

Article No. 8.

The Executive Committee shall have the general management of the Association. Five members of this Committee shall constitute a quorum at any regular or call meeting of the Committee.

Article No. 9,

Vacancies may be filled *pro tem.* by the President.

Article No. 10.

Regular annual meetings of the Association shall be held on the second Tuesday in September. Special meetings of the Association or the Executive Committee may be called by the President if, in his judgment, it is for the interest of the Association to do so. Ten members of the Associatio shall be a quorum at any regular or call meeting of th Association.

Article No. 11.

At each annual meeting the place for holding the nex regular meeting shall be selected by a majority of the mem bers present.

Article No. 12.

To become a member of this Association application must be made upon the prescribed form (see page 93 which must be accompanied by the entrance fee of $2.50 must have the endorsement of two members, and must b approved by the Executive Committee.

Article No. 13.

After the approval of an application for membership b the Executive Committe, the Secretary shall so notify th applicant, and his name shall be proposed for election the following regular meeting. Five negative votes sha exclude an applicant from membership.

Article No. 14.

After election of an applicant by the Association, th President and Secretary shall issue to him a membershi certificate.

Article No. 15.

The membership of any person shall begin on the day o his election.

Article No. 16.

The regular annual dues to the Association shall be $1.0 payable on the first day of January.

Article No. 17.

Any member failing or refusing to pay his annual due before the annual meeting of the year for which said due are applicable, shall not be entitled to a vote at said regula meeting, nor thereafter until all dues in arrears are paid.

ARTICLE. NO. 18.

Any member failing or refusing to pay his dues for three consecutive years shall be reported by the Secretary at the second annual meeting from the year of his first failure or refusal, and his name shall be stricken from membership in the Association.

ARTICLE NO. 19.

The Executive Committee shall have power to levy special assessments at any time to meet the necessary expenses of the Association, and all members will promptly comply with such notice of assessment, and their failure to do so will subject them to the same forfeiture of privilege and membership as prescribed in Articles Nos. 17 and 18.

ARTICLE NO. 20.

Any member may be expelled from the Association by a two-thirds vote of the members present at any regular meeting.

ARTICLE NO. 21.

Special committees may be appointed at any time by the President.

ARTICLE NO. 22.

This constitution may be revised or amended at any regular meeting of the Association by a vote of at least two-thirds of all members present.

BY-LAWS.

SECTION No. 1. At regular meetings the order of business, unless set aside by the votes of a majority of the members present, shall be as follows:

1. Opening exercises.
2. Reading minutes of last regular and any intervening meetings.
3. Enrollment of new members.
4. Reading communications.
5. Unfinished business.
6. Reports of committees and discussion of same.
7. Miscellaneous.
8. Discussion of proper questions, relating to both the duties of members and appointing committees.
9. Election of officers.
10. Choosing place of next regular meeting.

SEC. No. 2. Roberts' Rules of Order shall govern in all meetings of this Association and of the Executive Committee.

SEC. No. 3. Members must promptly notify the Secretary of any change in their position or address.

SEC. No. 3. These by-laws may be revised or amended at any regular meeting by a majority vote of those present.

FORM OF MEMBERSHIP APPLICATION.

ROADMASTERS' ASSOCIATION OF AMERICA.

MEMBERSHIP APPLICATION.

..................................189....

To the President and Members:

GENTLEMEN—I am employed as........................ in charge of..........miles of track on the............... Railroad................Division, Residence........... State of...........,and hereby make application for membership in your Association. If elected I will endeavor to faithfully discharge all duties imposed upon me by the Association, and will comply with the constitution, by-laws, and all rules of the Association.

Respectfully,

....

....

We hereby certify that Mr......................., who hereby applies for membership in the Roadmasters' Association of America, is a man of good moral character, and is in actual charge of..................miles of track on the ....Railroad with headquarters at..

Members of the Association { ....
....

NOTE.—This application must be made out and forwarded to the Secretary with $2.50 for entrance fee. Remit by draft; post office order, or registered letter; *not by express money order.*

CHARLES R. JOHNSON, President and Gen. Manager.
ARTHUR H. JOHNSON, Signal Engineer,

HENRY JOHNSON, Manager of Works and Treasurer.
D. W. PHELAN, Secretary.

THE JOHNSON RAILROAD SIGNAL COMPANY,

Designers and Manufacturers of

* RAILROAD *

SIGNALING * APPLIANCES

Of Latest and Most Approved Design.

Interlocking * and * Block * Signals.

Special Designs for Grade Crossings and Draw Bridges.

Distant Switch Signals.

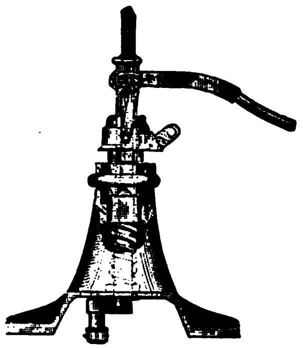
☞ Plans and estimates for interlocking and signaling yards and terminals submitted on application. Correspondence invited.

New York Office, 146 BROADWAY.

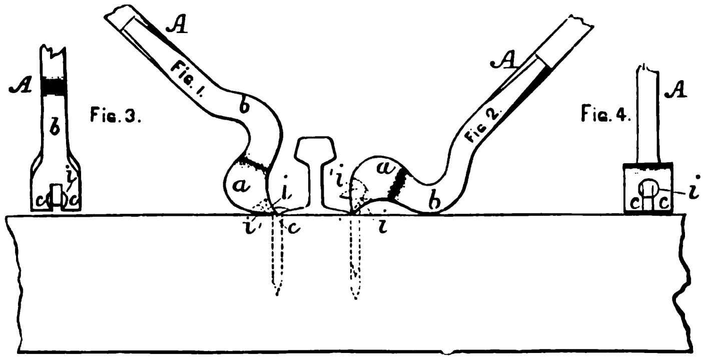
OFFICES AND WORKS:
RAHWAY, NEW JERSEY.

YOKED FROGS.

AUTOMATIC
SAFETY
SWITCH
STANDS.



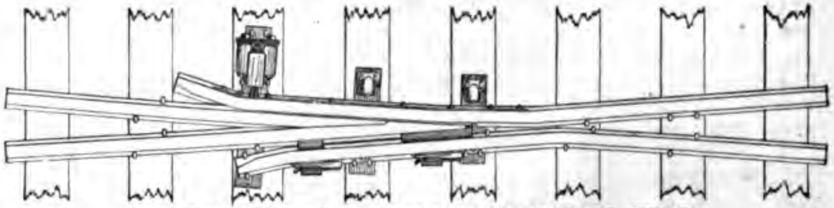
HAMM'S * SPIKE * PULLER.



RAMAPO IRON WORKS,
Hillburn, Rockland County, N. Y.

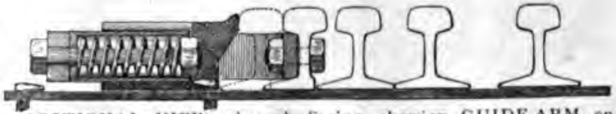
Pennsylvania Steel Co., Steelton, Pa.

Spring Rail Frogs.



KEYED PATTERN IMPROVED SPRING RAIL FROG.

Our Improvements in Spring Rail Frogs secure Safety and Durability to an unsurpassed degree, also convenience of placing and maintenance. The Spring Rail is strengthened against breakage, and is guided and controlled by the strongest and most efficient devices in use. Those devices are applied to various styles of Spring Frogs of BOLTED Pattern and RIVETED Pattern, as ordered, although the great demand is for the **KEYED PATTERN,** shown in cut, in which the fixed parts are tightly bound together inside of strong CLAMPS, which cannot work out of place, are much stronger than any other means of fastening the parts, and may always be tightened, as the parts wear, so as to keep everything snug and solid, and avoid rattling.



SECTIONAL VIEW, through Spring, showing GUIDE ARM on Spring Rail, by which Spring Rail is prevented from rising or rolling. The Guide Box stops the Spring Rail when it reaches the position indicated by dotted lines.

IMPROVED SWITCH STANDS.

The varieties embrace P. S. Co. AUTOMATIC, a great favorite, made in various forms. The High Signal Pattern shown in the cut, with target seventeen feet high, visible at great distance and above tops of cars, is a practical substitute for Distant Signals for Main Line Switches. The Low Target Pattern is excellent for yard switches. Both are Automatic only when switch is set for siding. STEELTON DETECTIVE, which detects obstructions in Lorenz Switches. BANNER Pattern, a favorite positive stand with target rotating quarter round, crank rotating half round, folding handle. YARD Pattern, a simple, strong stand, quarter turn crank and target, folding handle. UPRIGHT LEVER (Harp Pattern.) GROUND LEVERS, several sizes, and GROUND LEVER TARGET, etc.

Double Throw Split Switches,

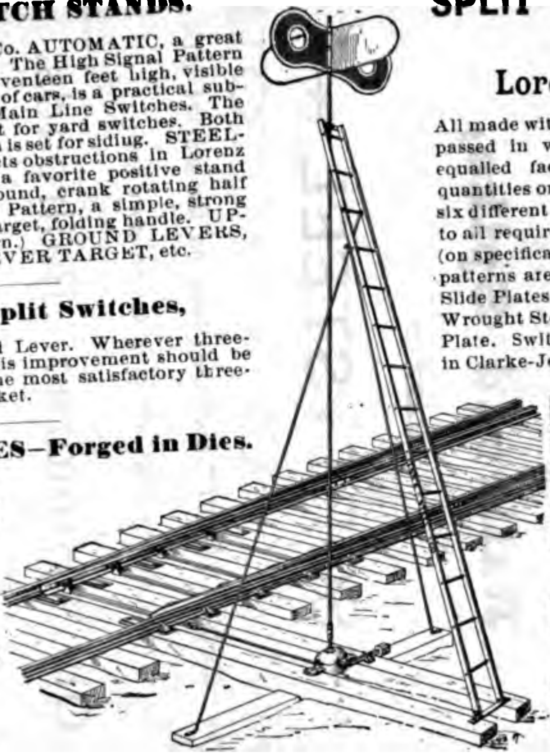
Operated wholly by ONE hand Lever. Wherever three-throw Turnouts are retained, this improvement should be used. It is justly regarded as the most satisfactory three-throw arrangement on the market.

STEEL RAIL BRACES—Forged in Dies.

Greatly superior to the ordinary Braces; are unbreakable, light in weight, strong, and of moderate cost.

For particulars, prices, etc.,
address

GEO. W. PARSONS,
Supt. F. S. & S. Dept.,
Pennsylvania Steel Co.,
STEELTON, PA.



SPLIT OR POINT SWITCHES

AND

Lorenz Safety Switches,

All made with INTERCHANGEABLE PARTS, unsurpassed in workmanship and fitting. Having unequalled facilities for their production, either for quantities or qualities, invite attention thereto. Have six different (standard) patterns of construction, suited to all requirements, and make several other patterns (on specifications). Imitations of our patented special patterns are extant, of which the public are warned. Slide Plates or Friction Plates are Steel, and Braces of Wrought Steel; both combined make the ideal Switch Plate. Switch point fitted as required, and elevated as in Clarke-Jeffery Switch when required.

STUB SWITCH FIXTURES, Wrought Iron Tie Bars, Head Chairs, etc., for all patterns of rail, made in various patterns.

STREET RAILWAY WORK, such as CURVES, FROGS, SWITCHES, CROSSINGS, to go into paved or Macadamized streets, furnished to suit various patterns of flat rails and T-rails.

ARE YOU INTERESTED IN SPIKES

The Best Fastening yet made for Safety, Economy and Durability, is the

"GOLDIE * PERFECT'

Railroad Spike,

MADE OF

SOFT * STEEL.

The "GOLDIE PERFFCT" Spike has been on the market litt more than a year, and is in use on more than

One * Hundred * Railroads.

Dilworth, Porter & Co., Limite

RAILROAD, STREET RAILWAY AND BOAT SPIKES,

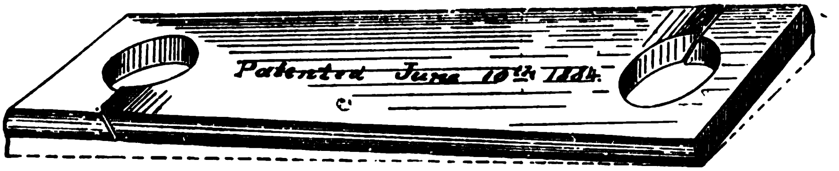
PITTSBURGH, PA

AUTOMATIC
Water Columns.
—AND—
TANK VALVES.

JOHN N. POAGE,
Cincinnati, O.
U. S. A.

THE

NOBLE WASHER.


Patented June 19th 1884.

The "NOBLE" WASHER is presented on its merits as the best and cheapest for securing track joints. It is a torsional spring, made of good quality of spring steel 1½ in. x ¾ in., and 1¾ in. x ¼ in. The average length Washer gives a tension of 5700 pounds to each bolt. THIS IS APPROXIMATELY THE SAFE LIMIT OF A ¾ TRACK BOLT AT THE ROOT OF THE THREAD, which is sufficient to reduce the wear of the bearing surfaces of the angle bars on rails, seating and giving them a bearing their full length, on the principle that "the nearer a perfect fit of the parts, the less the wear." It can be used on a four or six-bolted joint, having holes varying in length from 4 to 10 inches from centre to centre. This Washer has sufficient elasticity and stiffness to maintain a permanent tight joint, with the least possible amount of labor being required to tighten bolts. Joints equipped with them will not rattle. Notwithstanding it is a positive nut-lock (the slit at hole securing nut at any part of its turn automatically) no special merit is claimed for this feature. Joints do not get loose on account of nuts rotating back; it is caused by wear of the bearing surfaces. This must be reduced by seating the angle plates to the rail. A positive nut-lock, without elasticity, is of no value; the tension must exceed 8000 pounds per bolt to do the work.

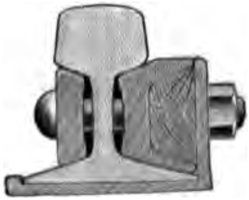
Correspondence and trial orders solicited. SAMPLES SENT FREE.

The A. FRENCH SPRING CO., Limited,
PITTSBURGH, PA.

The Weber Rail Joint

Received First Mention by Committee on Rail Joints at

ROADMASTERS' CONVENTION, HELD AT DETROIT, SEPT. 9, 1890.

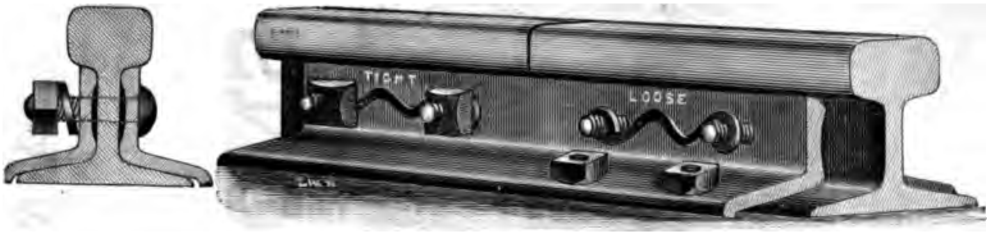


THE SAFEST JOINT MADE. EASILY APPLIED. MADE FROM MILD STEEL.

Does not require any manipulation of the rails. It gives a perfectly smooth, quiet riding track. No low ends. No broken rails at joints. Rails kept absolutely aligned and to surface. Saves the Rails and Ties. It reduces the cost of keeping up the track about 40 per cent.

The Weber Railway Joint Manufacturing Co., 74 Fifth Ave., New York.

☞ N. B.—The above claims have been demonstrated by twenty months' service in main line. ☜



SINGLE NUT LOCK.

THE "EXCELSIOR"

AUTOMATIC-NUT-LOCKS

OR

FISH PLATE SPRINGS.

The Cheapest, Most Durable and Effective Nut Lock Known.

Sample lots furnished for trial, Free of Expense, by forwarding the distance between Centres of Fish Plate Bolts. CORRESPONDENCE AND ORDERS SOLICITED.

These Nut Locks have been adopted by the New England Roadmasters, in Conventions held at Hartford, Conn., October 19 and 20, 1887, and Boston, Mass., August 15 and 16, 1888, as the Best Nut Lock known.

RUFFNER & DUNN,

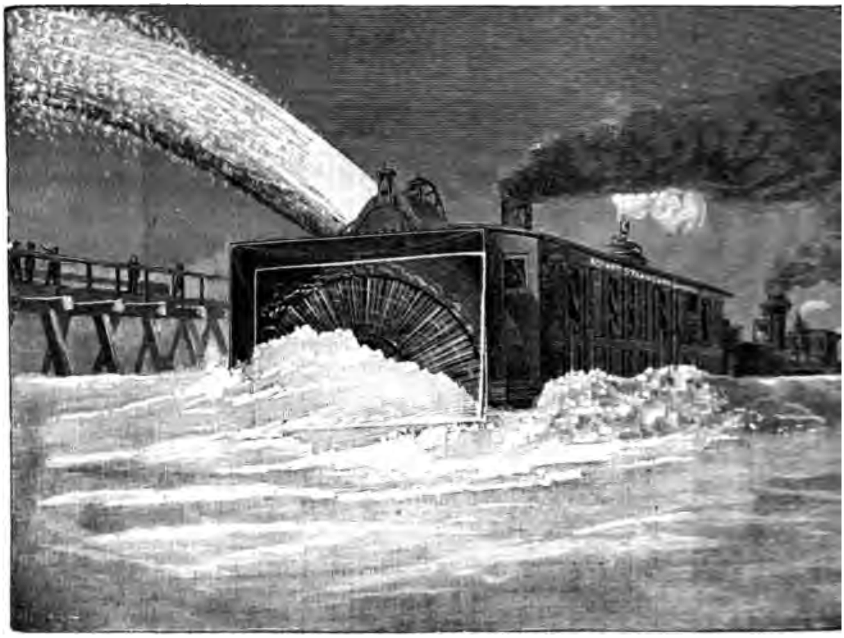
PATENTEES AND SOLE MANUFACTURERS,

SCHUYLKILL FALLS, : : PHILADELPHIA, PA.

AMERICA'S

* FAMOUS *

SNOW PLOW,



THE "ROTARY."

The Truth is Bound to Come Out,

SOONER OR LATER.

Railroad Officials will not Allow Themselves to be Misled by Erroneous Statements.

Notwithstanding the misrepresentations which have been made, and are being made, the facts this time are that the three great Pacific Companies, viz.: THE UNION PACIFIC, NORTHERN PACIFIC and SOUTHERN PACIFIC, are amongst the leading railway companies who have placed their snow plow orders with us for this year's delivery.

SNOW SHEDS and the old PUSH PLOWS are gradually but surely becoming a thing of the past, as several of the leading Western roads have decided not to build any more push plows or snow sheds, but instead they are equipping their lines with the "Rotary."

The Union Pacific leading the way next Winter with nine Rotaries, Northern Pacific, Southern Pacific and Denver & Rio Grande following close after, and the other Western lines are benefiting by the example of the above mentioned companies, who are the pioneers in adopting the Rotary as their standard snow plow, after having thoroughly tested all other known devices. The serious snow blockades which heretofore have been attended with such loss to life and destruction to machinery, together with the enormous expense incurred through loss of traffic and cost of labor while clearing the track in the old way, can be avoided in the future by use of the "Rotary."

After the competitive trials with the new fangled steam snow plows last Winter, we can safely guarantee the Rotary to clear ten miles of track to any other steam plow's one, and do the work fifty per cent. better with but one-half the motive power.

☞ *For photographs and full particulars of the competitive trials and complete success of the ROTARY, apply to*

The LESLIE BROS. MANUFACTURING CO.,

PATERSON, N. J.

JOYCE, CRIDLAND & CO.,
Dayton, O.

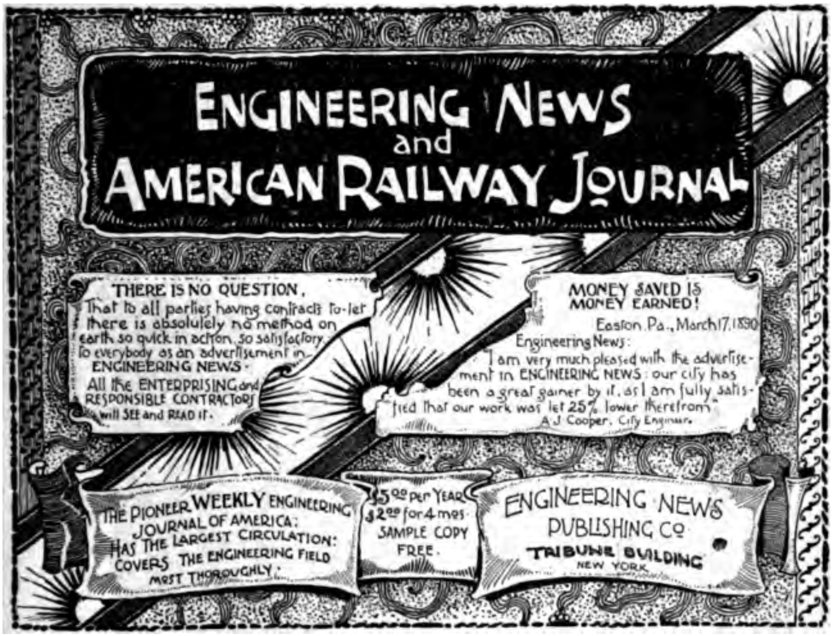
Manufacturers of J. O. JOYCE'S PATENT LEVER JACKS,

Compound
LEVER JACKS,
Screw Jacks
AND BENCH VISES.

Over sixty varieties of Lever and Screw Jacks, mostly for Railroad use.

☞ Catalogue and Price List on Application.

Our Nos. 38 and 39 Grip Track Jacks embody perfectly the advantages of Durability, Sure Grip, Close Alignment of Track, Power and Instantaneous Trip.



ENGINEERING NEWS
and
AMERICAN RAILWAY JOURNAL

THERE IS NO QUESTION,
That to all parties having contracts to-let there is absolutely no method on earth so quick in action, so satisfactory to everybody as an advertisement in ENGINEERING NEWS.
All the ENTERPRISING and RESPONSIBLE CONTRACTORS will SEE and READ it.

MONEY SAVED IS MONEY EARNED!
Easton, Pa., March 17, 1890.
Engineering News:
I am very much pleased with the advertisement in ENGINEERING NEWS: our city has been a great gainer by it, as I am fully satisfied that our work was let 25% lower therefrom.
A. J. Cooper, City Engineer.

THE PIONEER WEEKLY ENGINEERING JOURNAL OF AMERICA; HAS THE LARGEST CIRCULATION; COVERS THE ENGINEERING FIELD MOST THOROUGHLY.

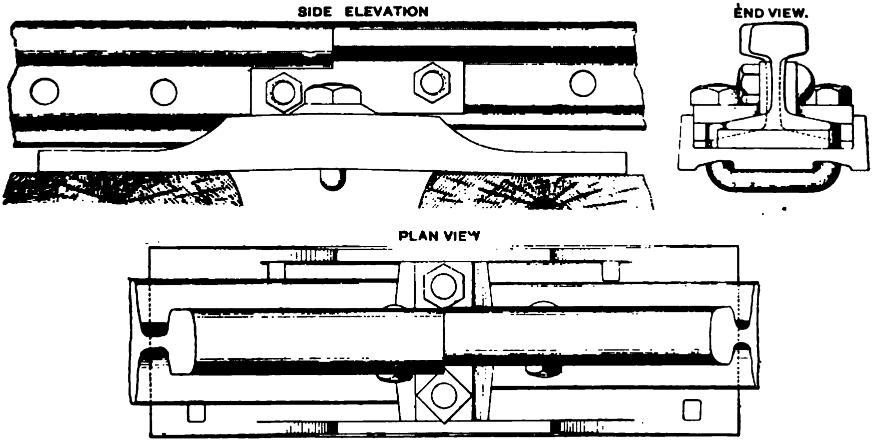
$5.00 per Year.
$2.00 for 4 mos.
SAMPLE COPY FREE.

ENGINEERING NEWS PUBLISHING CO.
TRIBUNE BUILDING
NEW YORK.

FISHER'S PATENT "STEP" JOINT,

For Connecting Rails of Different Sections.

ALL PARTS OF STEEL OR WROUGHT IRON.



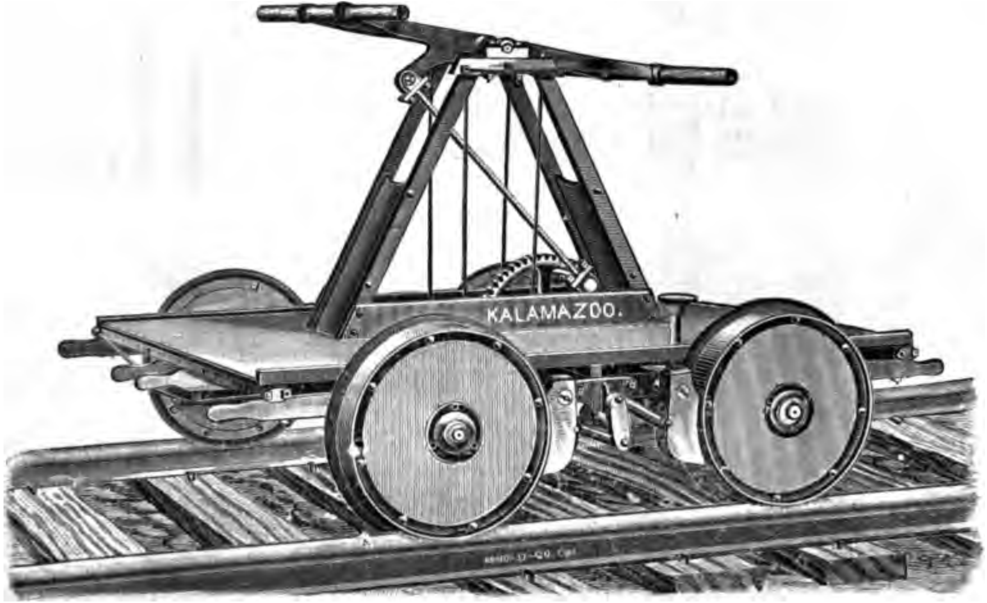
Making a Perfect Joint both Vertically and to Gauge.

FOR FURTHER INFORMATION, ADDRESS

FISHER RAIL JOINT WORKS, Sole Manufacturers, Trenton, N. J.

KALAMAZOO R. R. VELOCIPEDE AND CAR COMPANY,

Kalamazoo, Mich.,



Manufacturers of

25

Different Styles

— OF —

LIGHT RAILROAD CARS.

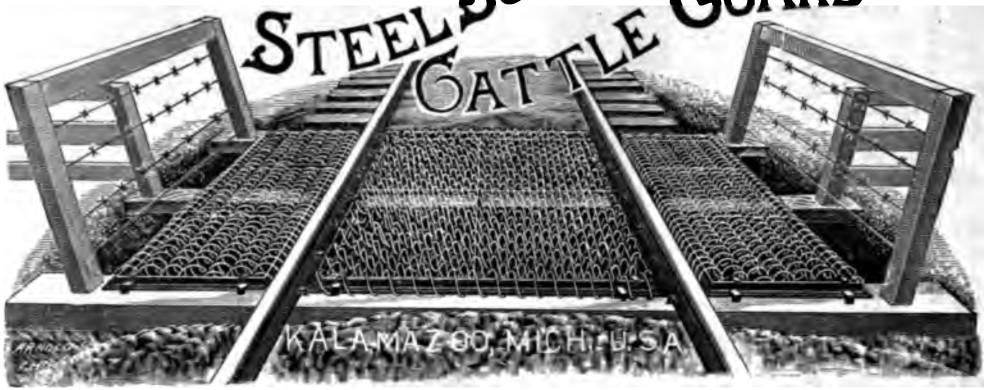
This cut shows our new light Section Hand-Car weighing only 475 pounds. This Car is fitted with 1½-inch Hard Machinery Steel Axles, 3-inch Brass Bearings, Side Brake, and our Patent Combination Paper and Wood Steel-Plated and Steel-Tired Wheels. Our STANDARD Section Hand Car weighs 550 pounds.

☞ Send for Special Illustrated Descriptive Circular of our Improved Steam Inspection Car, fitted with 3½-horse-power boiler and engine.

☞ Send for new Illustrated Catalogue. ☜

We sell our Goods on their Merits, and will send Sample Cars on 30 or 60 Days' Trial to Railroad Companies.

KALAMAZOO R.R. VELOCIPEDE & CAR CO'S STEEL SURFACE CATTLE GUARD


KALAMAZOO, MICH. U.S.A.

Special Merits Claimed.

1st. While appearing and being light in construction, it possesses a great degree of elasticity and strength.

2d. It is practically indestructible.

3d. It is the most formidable obstacle to the passage of either large or small animals yet presented to the attention of railway people. Its peculiar construction presents a series of upturned curves, which form a set of continuous ribs running diagonally across the the track, while intervening, the lower or downward turns of the steel spring coils present their irregular surface to the feet of small animals, which might evade the upper presentation mentioned.

4th. It is the cheapest of all, not only by virtue of its durability, but cheaper in its first cost than any substantial wood box pit.

5th. Stock will not voluntarily pass over it; but when frightened or stampeded, should they jump onto the guard they will not become entangled or confined therein, thereby preventing serious accidents by derailment of trains and expense to railroad companies on account of killing of stock.

6th. Numerous other points of merit are claimed for this guard, such as simplicity of construction, lightness for shipping and handling, least liability to clog with snow or ice, fair footing for trainmen, etc., etc., which it is not deemed necessary to explain in further detail here.

Ours is the only ALL STEEL surface cattle guard in the market.

Address all communications to **THE KALAMAZOO RAILROAD VELOCIPEDE AND CAR CO.,**
Kalamazoo, Mich., U. S. A.

ELLIOT FROG & SWITCH CO.,

East St. Louis, Illinois,

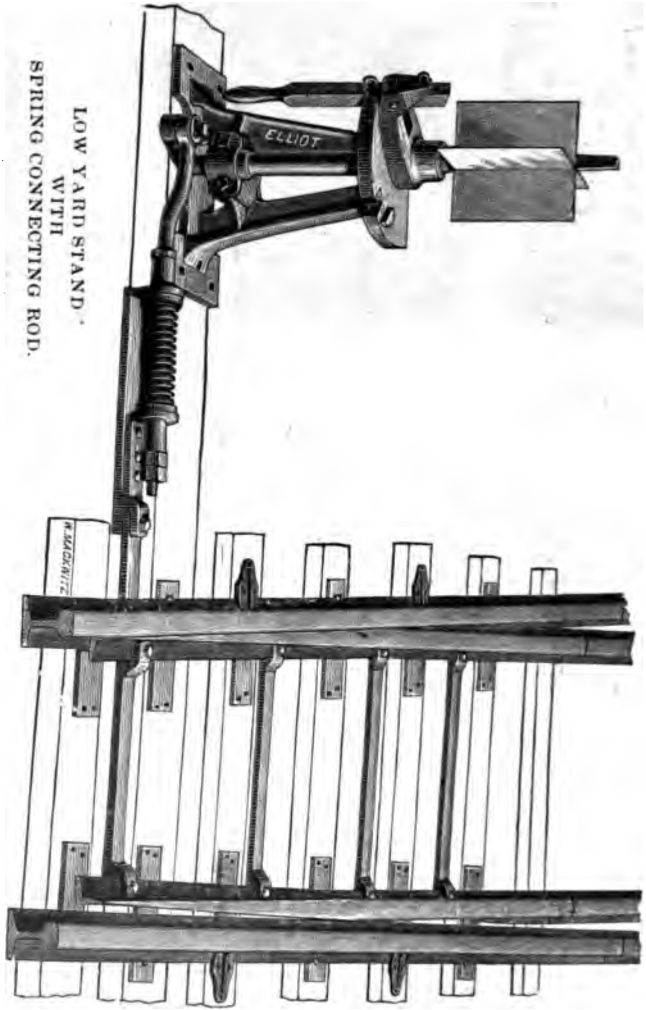
MANUFACTURERS OF

RAILROAD FROGS, CROSSINGS, SWITCHES,

VARIOUS PATTERNS OF

Switch Stands

And Every Description of Railroad Iron Work.



LOW YARD STAND WITH SPRING CONNECTING ROD.

SPLIT SWITCH.

☞ Catalogues furnished on Application.

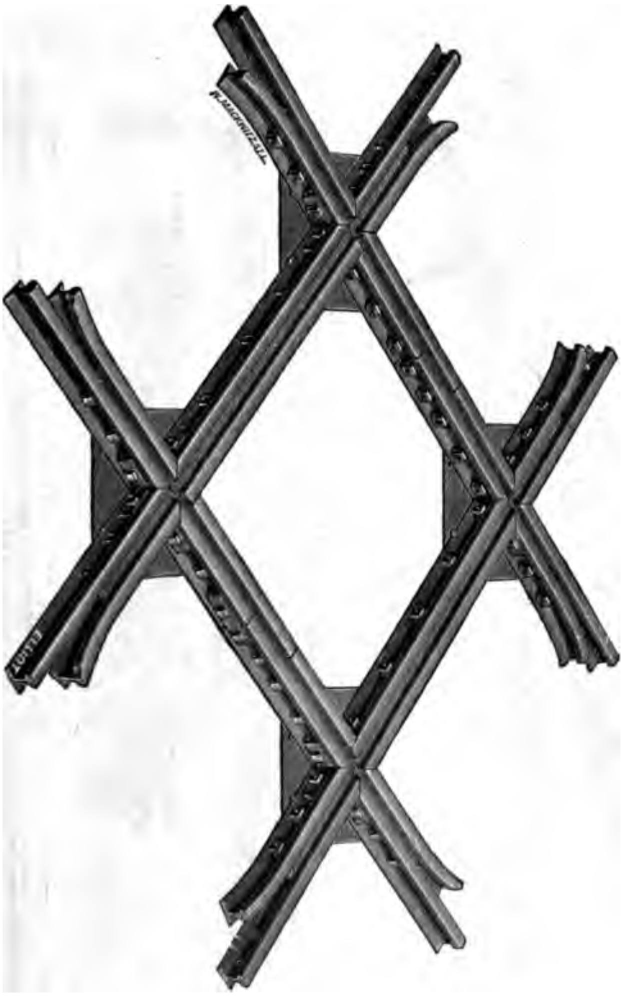
ELLIOT FROG AND SWITCH CO.,

East St. Louis, Illinois.

Our Stiff Rail Frogs and Crossings

Are Made with Solid (Welded) Wrought Iron or Steel Frames, and Bolts Used are of the Very Best Charcoal Iron.

CROSSINGS CONSTRUCTED WITH ANY DEGREE OF CURVATURE REQUIRED.



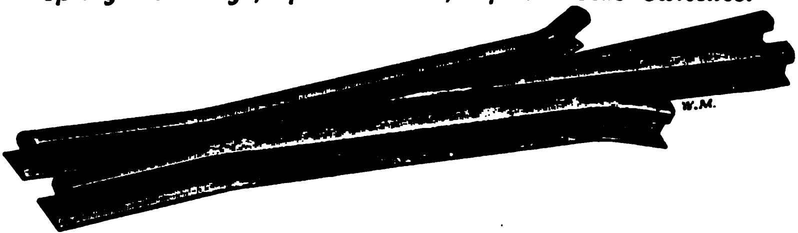
ALL SECTIONS AND WEIGHTS OF RAIL CARRIED IN STOCK.

☞ **Our Capacity Enables Us to Fill Orders Promptly.**

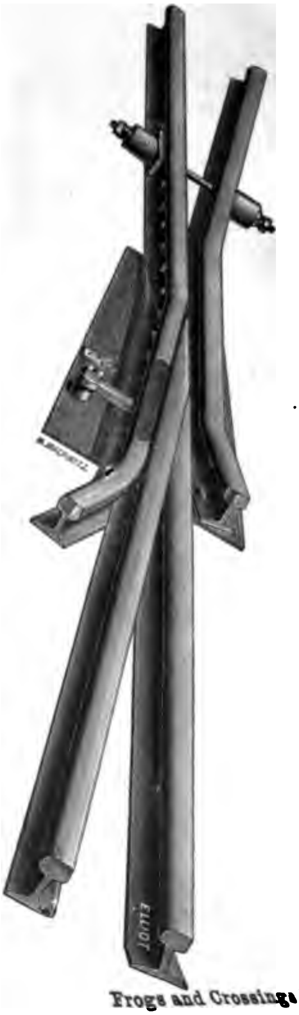
ELLIOT FROG & SWITCH CO.,

EAST ST. LOUIS, ILLINOIS.

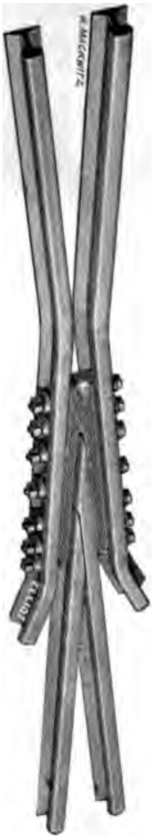
Spring Rail Frogs, Split Switches, Lap and Stub Switches.



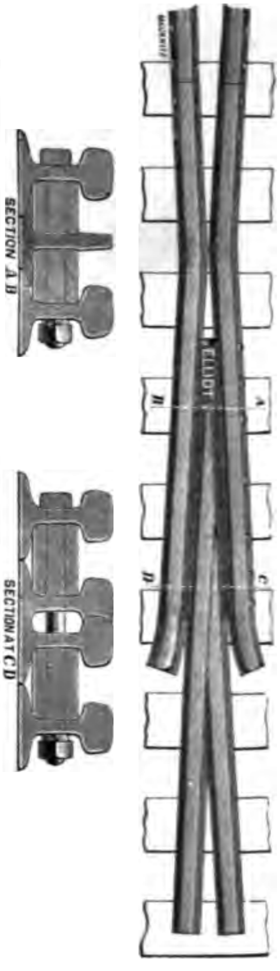
MAIN LINE FROG.



SPRING RAIL FROG.



STIFF RAIL FROG.



Frogs and Crossings Made any Angle or Length Required.

WILLIAM P. HALL, President. **A. W. HALL, General Manager.**
W. S. GILMORE, Treasurer. **S. MARSH YOUNG, Gen'l Agent.**

THE HALL SIGNAL CO.,

Sole Manufacturers and Owners of

The New Hall Signal.

Several Reasons Why It is The Best:

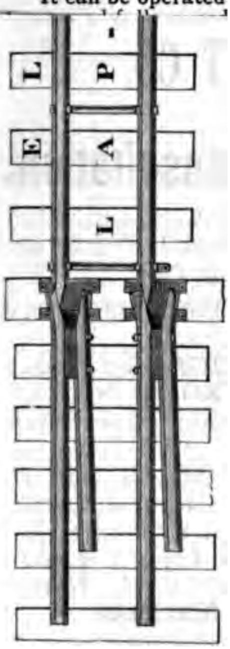
It is absolutely reliable : It has never given a false signal of safety when danger existed.

It is correct in principle : The breaking of an electric circuit allows the signal to fall to danger.

It is cheaper to erect and maintain than any other signal that has given even approximately satisfactory service.

It is most efficient : It has caused the fewest unnecessary stops in proportion to the number of operations.

It can be operated on either the permissive or absolute Block Sys-



STUB RODS.

HORIZONTAL GROUN

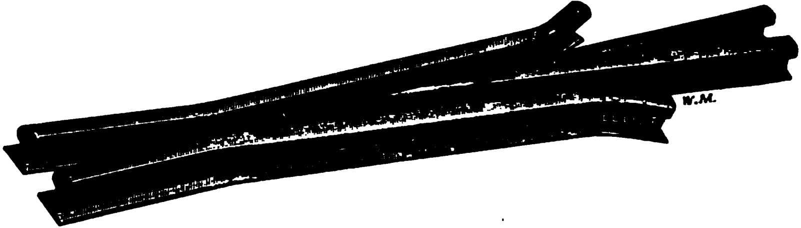
MAIN LINE SWITCH STAND.

☞ Estimates and other Information furnished.

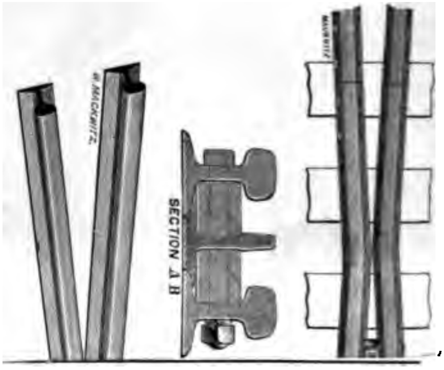
ELLIOT FROG & SWITCH CO.,

EAST ST. LOUIS, ILLINOIS.

Spring Rail Frogs, Split Switches, Lap and Stub Switches.



MAIN LINE FROG.



The ROBERT W. HUNT CO.

BUREAU OF

Inspection, Tests and Consultation.

INSPECTION of Rails, Fish Plate, Cars and other Railway Materials. Chemical and Physical Laboratories.

ANALYSIS of Ores, Irons, Steels and Oils.

CONSULTATION on Iron and Steel Metallurgy and Construction.

Principal Office, **The Rookery, CHICAGO**; *Branch Offices:* Hamilton Building, PITTSBURGH; No. 328 Chestnut Street, PHILADELPHIA; Union Trust Building, NEW YORK.

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WILLIAM P. HALL, President. **A. W. HALL, General Manager.**
W. S. GILMORE, Treasurer. **S. MARSH YOUNG, Gen'l Agent.**

THE HALL SIGNAL CO.,

Sole Manufacturers and Owners of

The New Hall Signal.

Several Reasons Why It is The Best:

It is absolutely reliable : It has never given a false signal of safety when danger existed.

It is correct in principle : The breaking of an electric circuit allows the signal to fall to danger.

It is cheaper to erect and maintain than any other signal that has given even approximately satisfactory service.

It is most efficient : It has caused the fewest unnecessary stops in proportion to the number of operations.

It can be operated on either the permissive or absolute Block Systems, and fully guards against the most prolific causes of railroad accidents.

It does all that is claimed for it, and is so guaranteed.

This System is in operation and process of erection on the **New York Central & Hudson River Railroad, Boston & Albany Railroad, New York, New Haven & Hartford Railroad,** and is also being used and introduced on many other leading railroads.

We furnish under our system, Block Signals, Interlocking Grade Crossing and Junction Signals, Switch Signals, Station Signals, Highway Grade Crossing Signals, and such other special applications as may be desired.

We will apply our signals on approval, and give ample time for a thorough trial before payment is required. We are also prepared to supply at our own expense, and **Lease** our **Automatic Electric Signals** to Railroad Companies at fixed annual rental for a guaranteed service to be rendered, payment of rental to be dependent upon fulfillment of of such guarantees.

THE HALL SIGNAL CO.,

WESTERN OFFICE:
Room 340, "The Rookery," Chicago.

50 Broadway, New York.

THE WEIR FROG CO.

Manufacturers of the Most Complete Line of

* Track Supplies *

And have the largest capacity of any similar concern West of the Allegheny Mountains.

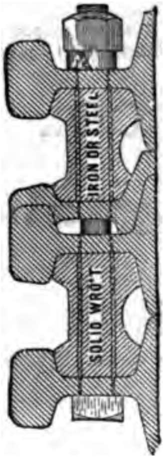
WORKS: Front, Smith and Water Sts.

CINCINNATI, OHIO.

In the list of our manufactures may be mentioned Six Styles of Rigid Frogs, Eight Styles of Spring Frogs, the well known Clarke-Jeffery Split Switch with F. C. Weir's Improvements, Crossings, etc., illustrations of a few of which are shown herewith.

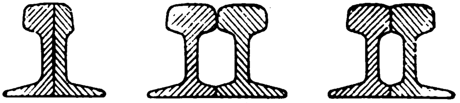
First, we desire to call the attention of the Roadmasters to our Rigid Frog, which is shown in cut, and Cross Sections, cuts 1 and 2, Cross Section of which shows our Specially Rolled Solid Steel or Wrought Iron Filling process. These Frogs are secured with ⅞ Through Bolts, the widest National Lock Washer Company's Nut Locks, and Hex Nuts, making a very strong and durable job.

There having been some discussion as to the merits of the different methods of constructing points of frogs, we have concluded to show them all up, believing there will be but one conclusion by the level-headed, practical trackmen.



No. 2.

No. 1.



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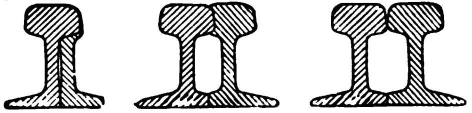

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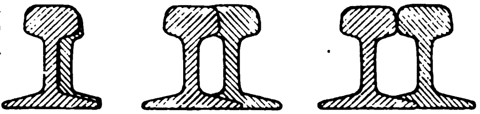

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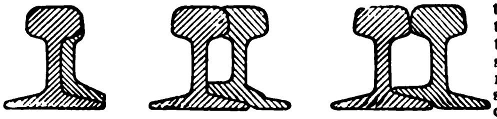
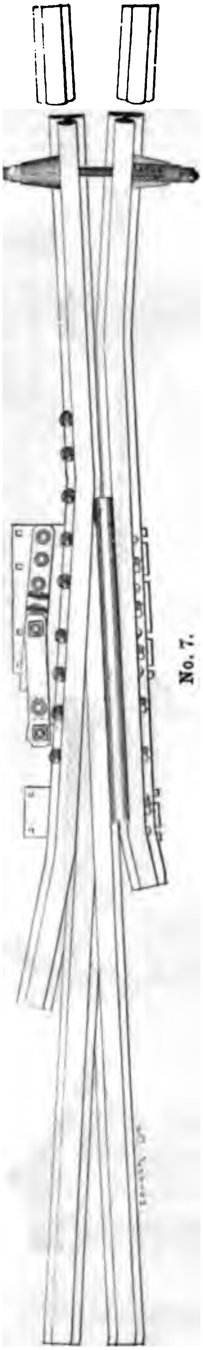


No. 6

Cut Cross Section No. 3 shows original method of maki'g points of frogs by notching the main point rail to receive short point rail. Cut No. 4 shows the first improvement on this, by which the head of the main point rail was preserved but the base weakened. Cut No. 5 shows the full strength of the main point rail preserved, but at the cost of very materially weakening the short point rail, so that it has a very slim vertical support. Cut No. 6 shows the latest improvement, which is the WEIR system, manufactured and controlled exclusively by us. This is what we term our Die-Formed Short Point. By this method we not only save the full strength of the main point rail, but more of the original strength of the short point rail, and produce a stronger construction of the point rails generally.

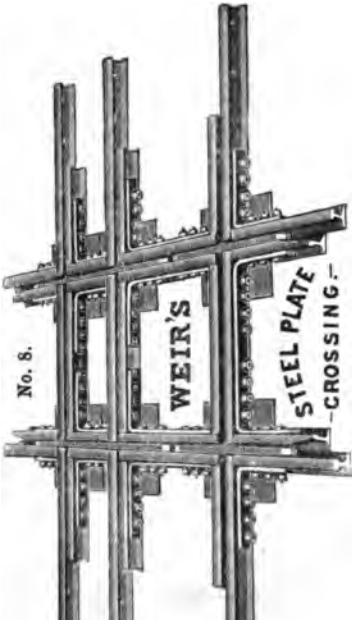
These cross section cuts are fair illustrations photographed down from full-sized drawings, therefore they can be unhesitatingly accepted as correct.



No. 7.

Cut No. 7 shows plan of one of our designs of Spring Frogs on Steel Plates. In this style of Frog we use a bent arm, one end riveted to the Steel Plate, and the other end acting as a holding-down device in connection with the double links which connect this arm to the movable Wing Rail. We know of no other device which resists the tendency of the Spring Wing Rail to creep, and at the same time produces so little friction in the parts as this device does.

The heavy Protection Bar, it will be observed, is secured to the web of the Rail with ¾-inch Bolts either way from the extreme point of the Frog, and this insures the holding together of the Rail in the event of its being broken, and thereby avoiding an accident. For the above reasons we believe this to be the most efficient and durable Spring Frog in the market. Besides this, we are making five other designs, some lower priced and some more expensive, but we feel confident we can suit any one, no matter what his ideas are. Blue Prints of these different designs will be furnished on application.



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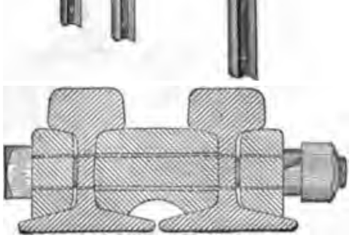


No. 9.

Our Crossing made with specially Rolled Solid Wrought Ir'n or Steel Filling, as shown by Cut No. 8, and Cross Section No. 9, are very extensively used.

These Crossings are secured with specially rolled very heavy Wrought Iron Bars, which, with the use of eight or more through bolts ⅞ of an inch in diameter, Hex Nuts, the widest National Lock Washer Company's Nut Lock, produce the strongest and most durable structure possible; and being supported on Steel Plates at each corner, the durability of not only the Crossing, but also the Ties is assured without impairing the elasticity.

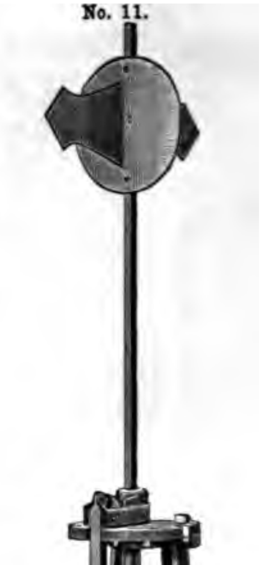
We show our patent Three-Throw Split Switch with patented Low Target Ground-Throw Stand by cut No. 10. This Switch presents many new and valuable features, and in Yards where Three-Throw Switches are sometimes a necessity, we can especially recommend it as being safer, more durable, and easier on the rolling stock than any Switch now in use. The Stand, which throws the switch by means of a single lever, is the only Low Target Ground-Throw Stand for Three-Throw Split Switches in the market, and as a Ground-Throw Stand is desirable in Yards, we feel that we have a Stand especially adapted to the purpose. The fastenings which connect the Rails and Bars are the same as those used on our Single Split Switches, *i. e.*, Steel and Die-Formed. They come nearer an absolutely unbreakable fastening than any now in use. The opening through which the Bar passes is large enough to permit considerable lateral movement of the Bar, which allows the Switch Rails to move more freely.

Our Steel combined Brace and Friction Plates used with these have no equal, as they are indestructable, and we alone have the right to furnish them. All of the Friction Plates of this Switch are Steel, and all of them pass through under both Main Track and Split Point Rails, so that an equal bearing is always insured on both the Main Track Rail and Friction Plates.

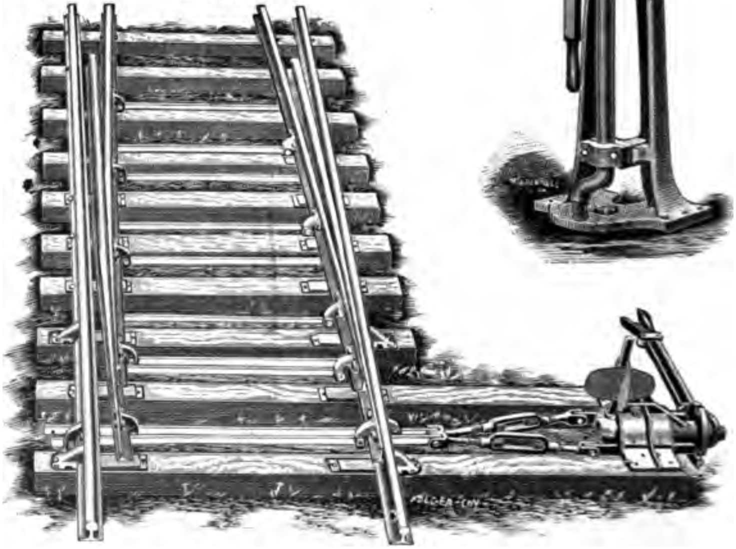
Our capacity for furnishing these Switches is practically unlimited.

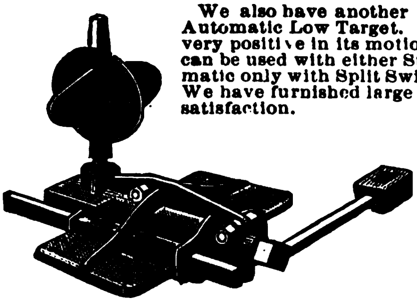
Our High Switch Stand, shown by cut No. 11, is what we term our Union Pacific Pattern; possesses the merit of not permitting tampering with the Connecting Rod when it is once put on in its place and the crank Shaft bolted up, as the Bottom Plate under the Stand prevents removal. The Locking Device in the Lever Casting at the top of the Stand is very simple and very effective, as will be seen by the cut. We make this pattern which we term High Stand, and also a Pony Stand, that is not more than half its height, with any style of Target as desired.

No. 11.



No. 10.





No. 12.

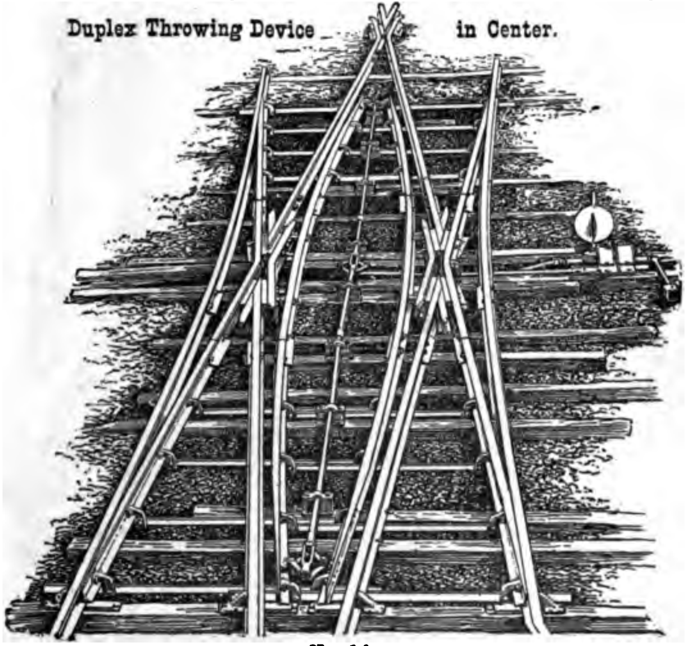
We also have another Switch Stand that we term our Automatic Low Target. This is shown by Cut No. 12. It is very positive in its motion, and a very durable Stand. It can be used with either Stub or Split Switch, but is Automatic only with Split Switches when trailing through them. We have furnished large numbers of these with excellent satisfaction.

No. 13.

Cut No. 13 illustrates our Open Hearth Steel Plate Head Chair. These are so well known that it is hardly necessary to make any remarks as to their merits, but it may not be generally understood that because of using Steel Plates we are enabled to preserve the elasticity of the Switch Joint, and thereby prolong the life of the Switch Rails, as well as furnish a Head Chair that will outlast any other in the market. We are furnishing these in Car-loads, which alone is sufficient as to their merits.

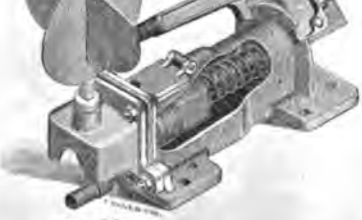
We call especial attention to our new design of Combination Crossing or Slip Switch with Duplex Throwing Device (see Cut No. 14). Two Rods are used for throwing the Switch Points (hence the name Duplex), which are operated by one Double-acting Stand. These Rods move simultaneously in opposite directions, and work double toggle-joints which throw the Switch Points. Turn Buckles are provided so that the Rods can be easily adjusted to give the required throw of the Switch Points. We are the first to place a Longitudinal moving Rod or Shaft in the centre of the Device between the Tracks, and thus relieve the Yards and Tracks of such obstructions. The movement of this Device is positive, accurate and easy, and is shown worked with one Stand. These Combination Crossings can be made either angle 7 deg. and 10 min., 8 deg. and 12 min., or 9 deg. and 32 min., but the No. 7 Combination, angle 8 deg. and 12 min., is considered the best, inasmuch as it fulfills the requirements of a Crossing and a Turnout with equally satisfactory results.

The Weir Frog Co.'s Combination Crossing.


Duplex Throwing Device in Center.

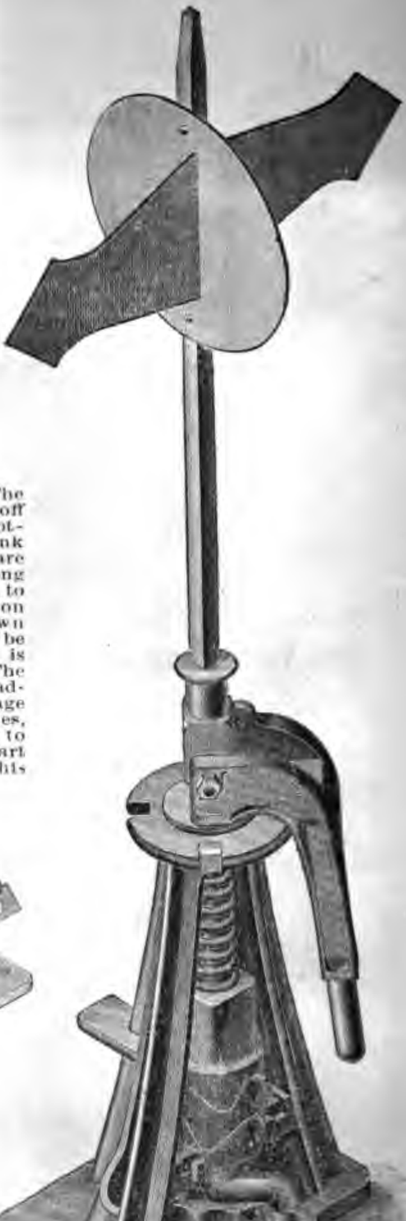
No. 14.

Fig. 15 shows our High Automatic Switch Stand, which possesses some entirely new features, the most conspicuous being the Three-part Clutch, having faces of different inclinations. By the use of this we are able to furnish a Stand which offers less resistance when the Switch Rail is being forced open, and at the same time closes the Point Rail tighter than with any other form of Automatic Clutch Stand. Besides the advantage of using a Three-part Clutch, there are one or two others worth mentioning. The Stand can be used on either one or two Ties, and the Target shaft can be turned to suit the Track. The Connecting Rod cannot be taken off the Crank without unbolting the bottom bearing and lifting the Crank Shaft, and the Crank and Shaft are one piece of Wrought Iron with long carefully fitted bearings and joints, to reduce wear. There is no strain on the Spring when the Switch is thrown by hand, and the Handle cannot be dropped unless the Switch Rail is tight against the Stock Rail. The Stand is Automatic whether padlocked or not. Another advantage is the large diameter of Clutches, which reduces possible lost motion to a minimum, and the Three-part Clutch insures a double life to this part of the mechanism and Stand.



No. 16.

Fig. 16 shows design of our Low Automatic Stand for Yard use, and is compact and thoroughly effective. It stands on two Ties parallel to the Track, and the Handle lies close to the body of the Stand, where there is no danger of tripping over it. It has all the advantages of the Automatic High Stand as regards its operation and the general details of its parts.



No. 15.

STEEL DIE-FORMED RAIL BRACES.

No. 17.

We show by Fig. 17 one of the six designs of Steel Die-Formed Rail Braces which we make. They are made of Homogeneous Steel Plate one-fourth to [illegible] thick as preferred, and are Die-Formed to fit any section of Rail, and our Machinery built especially to manufacture these Braces gives us a capacity of Ten Thousand a day.

IN MAKING ORDERS FOR

FROGS, SWITCHES, CROSSINGS, OR HEAD CHAIRS,

The section of Rail should be furnished, giving height and weight, distance of Fish Plate holes, gauge of Track, and angles of Frogs and Crossings. Blue Prints are requested for any or all of this work whenever they can be furnished. Promptness is guaranteed in filling orders, as well as good workmanship. Estimates, also Catalogues and Photographs furnished on application. Address

THE WEIR FROG CO.,

Front, Smith and Water Sts. CINCINNATI, O.

AJAX ⁕ FORGE ⁕ COMPANY,

MANUFACTURERS OF

Frogs, Crossings, Switches,

Patented Steel Rail Braces & Foot Guards,

CHICAGO, ILL.

J. R. ELLICOTT, General Agen

115 Broadway, New York